25448
S/137/61/000/005/080/092
A006/A101

18 8200

AUTHORS: Vereshchagin, I.P., Muryleva, L.K., Khlebutin, G.S.

TITLE: Changes in the mechanical properties of low-carbon steel during torsion

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 6, 1961, 5-6, abstract 6I35 ("Uch. zap. Permsk. un-t", v. 17, no. 3, 27 - 34)

TEXT: Since 1955 the authors have studied the effect of residual stresses on the mechanical properties of metals. An attempt of using off-center tension in order to strengthen the marginal threads of the specimen, did not yield satisfactory results, due to the impossibility of determining experimentally the range and degree of plastic deformation. In 1956 the authors used deformation by torsion in order to strergthen the metal. Plastic torsion of round specimens was carried out on a AM-1 type torsion test machine. The specimens were made of Ст.0 (St.0) grade steel of the following composition (in %): C 0.1, Si 0.17, Mn 0.35, P 0.014, S 0.025, Cr 0.02, Ni 0.1. Reduction of the metal in the cross section of the specimen takes place corresponding to the developing plastic deformation during the torsion of the specimen. The magnitude of reduction is the

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Changes in the mechanical properties ...

greater, the larger the torsion angle. This reduction entails uniform extrusion and homogeneous flow of the specimen metal. At such a homogeneous plastic metal flow, a field of residual normal stresses can not develop in the cross section after unloading of the specimen. The authors analyze the problems of raising the steel strength during torsion for the case when the pre-operational cold hardening does not coincide with the direction of the operational load. It was established that cold hardening by plastic torsion raised the shearing strength of ЭЙ 2(EYa2) steel to a lesser degree than preliminary cold hardening by tension, compression and drawing.

T. Rumyantseva

[Abstracter's note: Complete translation]

Card 2/2

31314
S/124/61/000/010/054/056
D251/D301

18.8200

AUTHORS: Vereshchagin, I.F., Muryleva, L.K. and Klebutin, G.S.

TITLE: The effect of the tempering temperature on the mechanical properties of plastic torsion of low-carbon steel

PERIODICAL: Referativnyy zhurnal. Mekhanika, no. 10, 1961, 63, abstract 10 V524 (Uch. zap. Permsk. un-t, 1960, 17, no. 3, 35-42)

TEXT: The effect is investigated of tempering at temperatures from 350-650° for 3 hours on the mechanical properties under tension of specimens of steel Ст.0 (St.0) preliminarily hardened by torsion of one to six turns. It is shown that tempering at 350° evokes high durability and a considerable lowering of the plasticity, the optimum properties are obtained with tempering in the interval 350-500°, and tempering at 530-570° evokes a greater lowering in the characteristics of plasticity. [Abstracter's note: Complete translation]

Card 1/1

24525

10 5200
3,1200

S/147/61/000/002/004/015
E031/E113

AUTHOR: Vereshchagin, I.F.

TITLE: The motion of a rocket along a three-point curve with constant tangential acceleration

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Aviatsionnaya tekhnika, 1961, No.2, pp. 35-46

TEXT: The rocket moves in such a way that it always lies on the straight line joining the launching point with the target (only the two-dimensional case is considered) which is assumed to be moving horizontally with constant velocity. Both the rocket and the target are assumed to be points. If the rocket is controlled ideally by its elevators, the relation between its coordinates and those of the target may be expressed in the form

$$x = \xi q, \quad y = \eta q \qquad (1.3)$$

where (x,y) is the position of the rocket and (ξ, η) is the position of the target. Knowledge of the control parameter q fixes the motion of the rocket. By differentiating the above equations the vector velocity of the rocket is obtained. This

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S/147/61/000/002/004/015
E031/E113

The motion of a rocket along a .....

yields differential equations for q with coefficients which are assumed to be known functions of the time; these are derived from the tracking motion and the initial velocity and tangential acceleration. If the rocket starts from rest, integration of the differential equations determines the motion of the rocket when the angle between the tangent to the trajectory and the horizontal is known as a function of the time. This involves numerical integration of a differential equation and launching angles of $26^{\circ}36'$, $33^{\circ}42'$, 45°, $63^{\circ}26'$, 90° and $116^{\circ}36'$ are chosen together with the value of -0.04 for $\beta = u/\eta_0$ (u is the velocity of the target, η_0 its altitude). This numerical integration is valid for motion of the rocket with any tangential acceleration (constant). The minimum value of the time for the rocket to reach the target is obtained for a launching angle of 56°. The curvature of the trajectory increases with the velocity of the target and diminishes as the tangential acceleration increases. Knowing the number n of 'g' to which the rocket is subjected at any moment, all the forces and moments for exact following of the theoretical trajectory can be calculated, loss of control can be prevented and destruction of the target assured. The quantity n is a minimum

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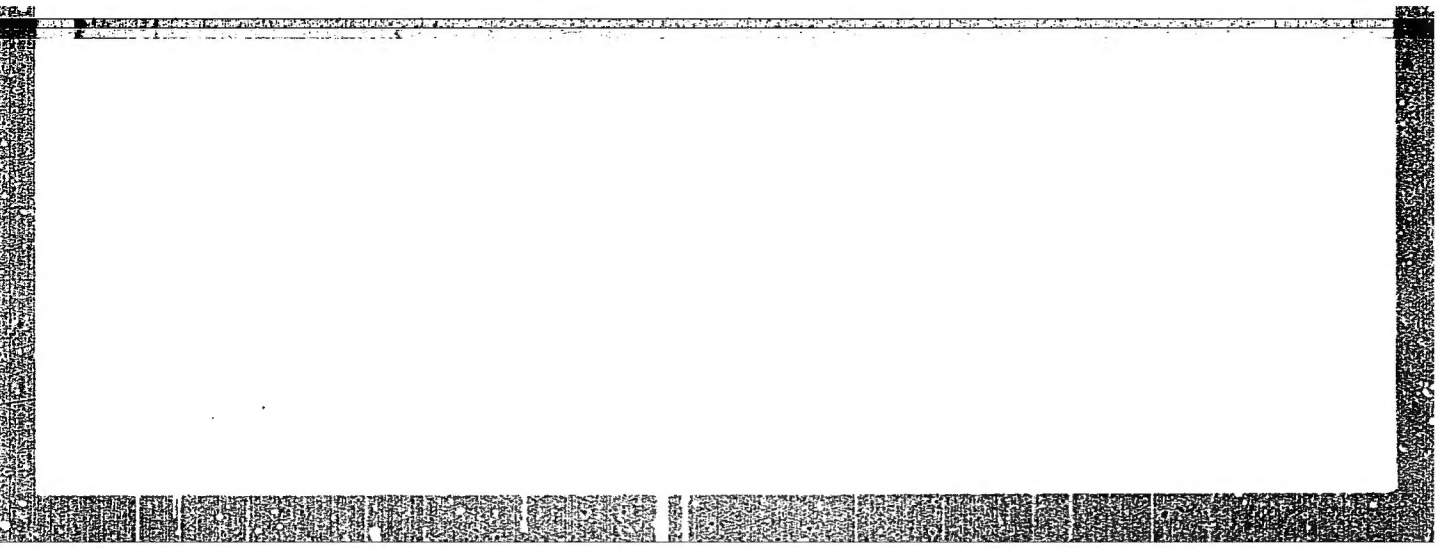
24525

The motion of a rocket along a ... S/147/61/000/002/004/015
E031/E113

for launching angles in the interval 33°42' to 63°26' when β is as above, η_0 = 5000 metres and $\gamma = a/\eta_0 = 0.006$ (a is the tangential acceleration). To avoid large values of n, launching must occur when the horizontal distance of the target is greater than twice the altitude. In order to determine the tangential and normal forces on the rocket rotation of the earth and movement of the atmosphere are neglected. The thrust is assumed uniform. The equations of motion are considered for the case when the angle of inclination of the exhaust with respect to the axis of the rocket is zero. The normal equation can be satisfied, given the motion, by suitable variation of mass and angle of attack. The variation of mass with time can be determined from the tangential equation by numerical integration. It is shown that for all practical purposes the variation is linear.
There are 18 figures, 4 tables and 3 references: 1 German, 1 Soviet and 1 Russian translation.
ASSOCIATION: Kafedra mekhaniki, Permskiy gosudarstvennyy universitet (Department of Mechanics, Perm State University)
SUBMITTED: April 19, 1960

Card 3/3

which interception of the target occurs. A transcendental equation determining



APPROVED FOR RELEASE: 09/01/2001 CIA-RDP86-00513R001859420020-0"

VERESHCHAGIN, L.F.; STARODUBTSEV, S.V., akademik; YANUSOV, M.S.

Coloring and luminescence of a synthetic ruby irradiated by Co^{60} gamma rays. Dokl. AN SSSR 159 no.2:300-302 N '64.
(MIRA 17:12)

1. Institut fiziki vysokikh davleniy AN SSSR i Institut yadernoy fiziki AN Uzbekskoy SSR. 2. Chlen-korrespondent AN SSSR (for Vereshchagin). 3. AN Uzbekskoy SSR (for Starodubtsev).

VERESHCHAGIN, L.F.; KALASHNIKOV, Ya.A.; FEKLICHEV, Ye.M.; NIKOL'SKAYA, I.V.; TIKHOMIROVA, L.M.

Mechanism underlying the polymorphic transformation of graphite into diamond. Dokl. AN SSSR 162 no.5:1027-1029 Je '65. (MIRA 18:7)

1. Institut fiziki vysokikh davleniy AN SSSR. 2. Chlen-korrespondent AN SSSR (for Vereshchagin).

VERESHCHAGIN, L.F.; KABALKINA, S.S.; LITYAGINA, L.M.

Effect of high pressure on the structure of tin oxide. Dokl. AN SSSR 163 no.2:326-328 Jl '65. (MIRA 18:7)

1. Institut fiziki vysokikh davleniy AN SSSR. 2.Chlen-korrespondent AN SSSR (for Vereshchagin).

L 1159-66 EWT(1)/EWT(m)/EPF(c)/EPF(n)-2/EWA(d)/EWP(t)/EWP(k)/EWP(b)/EWA(c) IJP(c)
ACCESSION NR: AP5021893 JD/WW/HW/GG UR/0020/65/163/006/1437/1438

AUTHORS: Churagulov, B. R.; Feklichev, Ye. M.; Kalashnikov, Ya. A.; Vereshchagin, L. F. (Corresponding member AN SSSR)

TITLE: Differential-thermal analysis at pressures up to 100 k bar

SOURCE: AN SSSR. Doklady, v. 163, no. 6, 1965, 1437-1438

TOPIC TAGS: cerium, barium, bismuth, silver chloride, pressure, solid state transition, thermal analysis

ABSTRACT: A differential-thermal analysis method has been developed by means of which solid state transitions may be studied. The apparatus is shown schematically in Fig. 1 on the Enclosure. The method was applied to the study of phase transitions in Ti, Ce, Ba, and AgCl. The thermograms obtained are given in Fig. 2 on the Enclosure. It is suggested that the method may be used for high pressure calibration. Orig. art. has: 2 graphs and 1 equation.

ASSOCIATION: Institut fiziki vysokikh davleniy, Akademii nauk SSSR (Institute of Physics for High Pressures, Academy of Sciences SSSR); Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 24Mar65 ENCL: 02 SUB CODE: ME, TD
NO REF SOV: 007 OTHER: 002

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L 1159-66
ACCESSION NR: AP5021893

ENCLOSURE: 01

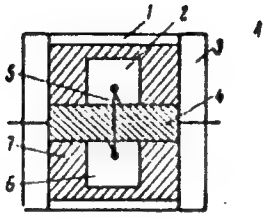

Fig. 1.
Schematic of the introduction of differential thermocouples into the high pressure chamber
1- talcum cover; 2- metallic Bi; 3- talcum isolating screen; 4- teflon and talcum washer; 5- differential chromel-alumel thermocouple; 6- specimen; 7- pressure transducing substance

Card 2/3

L 1159-66

ACCESSION NR: AP5021893 ENCLOSURE: 02

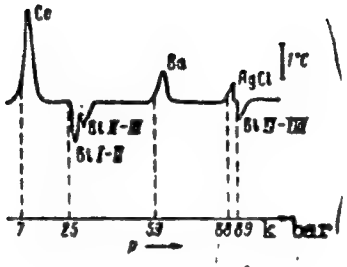

Fig. 2.
Composite thermogram for the different substances

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VERESHCHAGIN, I.K.

Electroluminescence and surface properties of crystal phosphors.
Izv. AN SSSR. Ser. fiz. 25 no.4:518-520 Ap '61. (MIRA 14:4)

1. Chernovitskiy gosudarstvennyy universitet.
(Phosphors)

ROYTBURD, Lazar' Nisonovich; VERESHCHAGIN, I.K., prof., doktor ekon.nauk, retsenzent; BANNYY, N.P., dotsent, kand.ekon.nauk, red.; PINEGIN, I.I., red.; KLEYNMAN, M.R., tekhn.red.

[Outline of the economic aspects of ferrous metallurgy] Ocherki ekonomiki chernoi metallurgii. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1960. 564 p.
(MIRA 13:9)

(Steel industry--Finance)

VERESHCHAGIN, IVAN KUZMICH

O Zakonomernostyakh Ekonomi Cheskogo Razvitiya Mirovoy Sotsialisticheskoy Sistemy, (by) I. Vereshchagin (1) V. Rybalkin. Moskva, Izd-vo IMO, 1961.
174 p. tables.
Includes bibliographical references.

S/058/61/000/012/030/081
A058/A101

AUTHORS: Vereshchagin, I. K., Strinadyuk, Ye. M.

TITLE: Concerning the production of electroluminescent phosphors

PERIODICAL: Referativnyy zhurnal, Fizika, no. 12, 1961, 224, abstract 12V529 ("Nauchn. yezhegodnik za 1957 g. Chernovitsk. un-t." Chernovtsy, 1958, 483-484)

TEXT: There are described the technique of production and the characteristics of a series of ZnS and ZnS · CdS luminescent phosphors with activators Cu, Ag, PbAl and Mn in the form of various compounds, NH_4Cl melt, etc. Batch components were calcinated in closed bulk in the range 700 - 1,200°C for 15-40 min, after which they were oven-cooled to 500°C. There are given data on activator concentration, and on calcination temperature and duration, for the four ZnS compositions giving the brightest luminescence (light blue, dark blue, green, and yellow color). Some enhancement of luminescence brightness can be achieved by means of calcination in H_2S and HCl atmosphere.

V. Kosikhin

[Abstracter's note: Complete translation]

Card 1/1

SOV/139-58-6-18/29

AUTHORS: Vereshchagin, I.K. and Teslyuk, V.S.

TITLE: Electroluminescence of Zinc Oxide as a Function of Heat Treatment Conditions (Elektrolyuminestsentsiya okisi tsinka v zavisimosti otusloviy termicheskoy obrabotki)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Fizika, 1958, Nr 6, pp 114-117 (USSR)

ABSTRACT: The paper reports an investigation of the effect of temperature and atmosphere of heat treatment of ZnO on its electroluminescence. Three series of samples were prepared. The first series was obtained by heating pure ZnO in air to a given temperature between 100 and 1000°C and holding it at this temperature for 15 minutes. The second series was prepared in the same way as the first series but NH_4Cl flux was used. The third series of samples was prepared by heating to a given temperature between 100 and 500°C in 10^{-3} mm Hg vacuum. The samples in the form of powders suspended in oil were placed between two plane electrodes, one of which was transparent. Green emission of ZnO, excited by an alternating field of a given frequency between 50 and

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Electroluminescence of Zinc Oxide as a Function of Heat Treatment Conditions

300 c/s, was received by a photomultiplier FEU-19 M and recorded by a valve (tube) voltmeter and an oscillograph. All measurements were carried out at 20°C. The results of measurements are shown in Fig 1-3; the emission intensities are given in the same relative units in all the three figures. The samples of the first series had emission maxima if they were heated to temperatures of 200 to 300 or 500 to 600°C (Fig 1). The electroluminescence intensity of samples of the second series had maxima at heat treatment temperatures of 400 and 650°C. A third maximum near 1000°C was observed in samples of both the first and the second series. Samples heated in vacuo had an emission maximum at 300°C and possibly at 500 - 600°C (Fig 3). Fig 4 shows one electroluminescence curve for each series of samples (150 c/s excitation) as well as curves representing photoluminescence, conductivity and concentration of free Zn atoms in ZnO. The curves of

Electroluminescence of Zinc Oxide as a Function of Heat Treatment Conditions

Fig 4 show that the electroluminescence maximum near 600°C is stable and coincides with the maxima of photoluminescence and conductivity. Position of this maximum does not depend on the method of preparation of the samples and it is possible that the emission is due to crystals as a whole. This agrees with Mollwo's results (Ref 2), who found that heating in an atmosphere of oxygen or air affects only the surface emission of ZnO monocrystals. Coincidence of the electroluminescence maximum at 600°C with the maxima of dark conductivity and density of excess zinc suggests that these excess zinc atoms are responsible for this electroluminescence maximum. The position and amplitude of the electroluminescence maximum between 200 and 400°C depend strongly on the previous heat treatment, on the type of sample and the method of excitation. This maximum is

Electroluminescence of Zinc Oxide as a Function of Heat Treatment Conditions

probably due to surface emission of ZnO. There are 4 figures and 3 references of which 1 is Soviet, 1 German and 1 Dutch.

ASSOCIATION: Chernovitskiy Gosuniversitet (Chernovtsy State University)

SUBMITTED: 17th March 1958

Card 4/4

VERESHCHAGIN, I.K.

Connection between the luminescence, electrical, and chemical properties of zinc oxide. Izv.vys.ucheb.zav.; fiz. no.2:31-36 '60. (MIRA 13:8)

1. Chernovitskiy gosuniversitet.
(Zinc oxide)

69844
S/051/60/008/03/031/038
E201/E191

24.7400
24.3500

AUTHOR: Vereshchagin, I.K.

TITLE: The Effect of Adsorption of Gases on Electroluminescence

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 3, pp 420-421 (USSR)

ABSTRACT: It is known that electroluminescence of phosphors suspended in dielectrics is affected by the state of their surface (Refs 1, 2). Consequently adsorption of gases should affect electroluminescence. The results of measurements of the intensity of electroluminescence of ZnO in air and in vacuum are shown in a figure on p 420 (similar behaviour was also observed in some ZnS phosphors). It is seen that, in the absence of an external electric field, evacuation intensifies electroluminescence of ZnO, producing first a flash which then decays but the new steady-state intensity level is 2-3 times higher than the corresponding value in air. When air is let in the intensity falls rapidly to the original value. If evacuation is carried out with the field applied across the sample, then no flashes occur and the intensity of electroluminescence reaches practically immediately a level

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E201/E191

The Effect of Adsorption of Gases on Electroluminescence

which is lower than the level in vacuum without a field. Then if the applied field is removed the intensity rises. The intensity can be raised even further by irradiation with ultraviolet light. The electrical conductivity is also affected by these various treatments. On evacuation the conductivity rises by 9-10% and the action of ultraviolet light doubles the conductivity. The reason for this rise of the conductivity is a slight desorption of oxygen or other electro-negative compounds on evacuation which leads to liberation of electrons; irradiation with ultraviolet light produces photo-desorption. Since evacuation at room temperature removes only a small amount of adsorbed oxygen from the surface of ZnO, the rise of electroluminescence and a fall of photo-e.m.f. observed on evacuation are probably due to desorption of other gases or vapours. The ultraviolet light causes desorption of chemi-sorbed oxygen and this is the reason for the strong rise of the electrical conductivity and electroluminescence after ultraviolet irradiation. Both physical and chemical adsorption produce

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S/051/60/008/03/031/038
E201/E191

The Effect of Adsorption of Gases on Electroluminescence

distortion of the energy bands near the surface. The applied alternating field lowers periodically the height of the energy barriers and facilitates supply of the electrons to the surface. This decreases the probability of liberation of oxygen and desorption and is the cause of the fall of the intensity of electroluminescence on evacuation with the field applied across the sample. From the fall of the intensities of electroluminescence and photoluminescence and the decrease of the electrical conductivity on exposure to air we can calculate the thickness of the layer which takes part in electroluminescence; it amounts to 0.1-0.01 μ. The experiments described above confirm the strong dependence of electroluminescence on the surface state of the phosphor crystals.

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There are 1 figure and 10 references, of which 7 are Soviet, 2 English and 1 Dutch.

SUBMITTED: October 12, 1959

83921
S/051/60/009/004/019/034
E201/E191

6.4760

AUTHOR: Vereshchagin, I.K.

TITLE: Ageing of ZnS Phosphors

PERIODICAL: Optika i spektroskopiya, 1960, Vol 9, No 4, pp 519-521

TEXT: The author compared the electroluminescence and photoluminescence spectra measured immediately after preparation of ZnS and ZnS—CdS phosphors and after 1-3 years' storage. The phosphor powders were prepared in open or closed crucibles in air at 500-1000 °C; they contained silver and large amounts of copper. The short-wavelength band in the photoluminescence spectra (characteristic of non-activated and Ag-activated phosphors) was intensified by 1-3 years' storage. The band due to copper was either weakened by storage or it remained unaffected. The electroluminescence spectrum was not greatly affected by long storage. The photoluminescence spectrum of stored phosphors approached the form of the electroluminescence spectrum. Some of the results are shown in a figure on p 520. Fig (a) represents ZnS:Ag:Cu, while Fig (б) represents ZnS—CdS: :Ag:Cu with 10% CdS. Curves denoted by 1 give the photo-luminescence spectra immediately after preparation, and after

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S/051/60/009/004/019/034
B3921
E201/E191

Ageing of ZnS Phosphors

long storage followed by a 250 °C, 25 min heating; curves 2 give the photoluminescence spectra after long storage but without a subsequent heating; curves 3 represent the electroluminescence spectra of freshly prepared and of stored and heated samples. The spectra were recorded with a monochromator УМ-2 (UM-2) and a photomultiplier ФЭУ-19М (FEU-19M). The changes which occurred after long storage could be removed entirely by heating above 200 °C for 20-30 min. The changes on ageing were ascribed to changes in the amount of free sulphur in the phosphors: CuS or Ag_2S were formed slowly in the phosphors at room temperature. Heating after storage decomposed CuS and the phosphors recovered their initial properties.
There are 1 figure and 7 references: 2 Soviet, 1 English, 2 German, 1 French and 1 Czech.

SUBMITTED: March 21, 1960

Card 2/2

S/048/61/025/004/028/048
B117/B212

24,3500

AUTHOR: Vereshchagin, I. K.

TITLE: Electroluminescence and surface properties of crystal phosphors

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 4, 1961, 518-520

TEXT: The present paper was read at the 9th Conference on Luminescence (crystal phosphors) and it contains a report on investigations made to find the relation between surface properties of crystal phosphors and electroluminescence processes. The author has shown in a previous paper that the catalytic activity of ZnO, which is a surface effect, will change simultaneously with the electroluminescence if preheating of the samples is done under changed conditions. On the other hand the electroluminescence of ZnO and numerous polycrystalline ZnS and (Zn,Cd)S-luminophors will be strongly influenced by gas adsorption. The fact that a simple evacuation of gases at room temperature will already bring about a strong change of the luminescence and the photo-emf points to a chemical

Card 1/3

S/048/61/025/004/028/048
B117/B212

Electroluminescence and surface...

nature and a polar-covalent character of the weak binding of the outer layer of gas molecules and crystals. Since the luminescence will increase during evacuation at a certain decrease of the barrier, the rate of the radiationless surface recombinations is very important for the electroluminescence. Under the influence of an alternating field the barriers will decrease periodically and electrons are brought to the surface therefore, the electroluminescence has to be very sensitive with respect to the surface recombination. Besides that, the electric luminescence and also the photo-emf are a function of the occupation of the surface level. An initially fast increase of the electroluminescence and the photo-emf can be observed if the ZnO sample is not excited. This might be a function of the electrons released from the surface traps. The magnitude of the maximal value is dependent on the time during which the sample is kept in the dark or without a field. Therefore, it has been established that the conditions prevailing on the surface of electroluminophors will influence the electroluminescence processes very strongly. For this reason, they have to be taken into account not only in the theory of electroluminescence but also when producing luminophors for practical purposes. There are 1 figure and 9 references: 6 Soviet-

Electroluminescence and surface...

S/048/61/025/004/028/048
B117/B212

bloc and 3 non-Soviet-bloc. The three references to English language publications read as follows: G. W. Pratt, H. H. Kolm, Semiconductor Surface Physics, p.23. New York, 1957; R. H. Bube, J.Chem. Phys., 21, 1409 (1953); S. H. Liebson, J. Electrochem. Soc., 101, 362 (1954).

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovtsy State University)

X

44096
S/185/62/007/011/016/019
D234/D308

AUTHORS: Vereshchapin, I.K. and Kosyachenko, L.A.

TITLE: Electrical properties of the electro-luminophore ZnS-Cu

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 7, no. 11, 1962, 1252-1253

TEXT: ZnS-Cu 30 - 50 μ monocrystals were investigated; voltage-current characteristics for $v_{eff} \leq 12$ v are plotted. The first inflection of the characteristic is in most cases observed at 4 - 7 v. It is concluded that the similarity of the I(V) dependence to the forward current in a p-n junction is accidental and that the mechanism of electroluminescence assumed by W.A. Thornton (J. Electrochem. Soc., 108, 636, 1961) can predominate only for $v < 2.6$ v. There is 1 figure.

ASSOCIATION: Chernivetskiy derzhuniversytet (Chernovtsy State University)

Card 1/2

Electrical properties ...

S/185/62/007/011/016/019
D234/D308

SUBMITTED: July 9, 1962

Card 2/2

33647

S/051/62/012/001/016/020
E075/E536

24.3500 (1137, 1138, 1144)

AUTHORS: Vereshchagin, I.K. and Drapak, I.T.

TITLE: Electroluminescence of ZnO monocrystals

PERIODICAL: Optika i spektroskopiya, v.12, no.1, 1962, 122-123

TEXT: Transparent hexagonal prism crystals of ZnO, length 8-15 mm and thickness 0.1 mm, were obtained from gaseous phase at 1350-1400°C. The crystals had a resistance of the order of 50 k-ohm and possessed green and yellow photoluminescence. The crystals subjected to the action of alternating electric field of $10^5 - 10^6$ V/cm tension, begin to emit green or yellow light. One of the electrodes used was insulated from the crystal by mica and the other electrode was a tungsten wire in direct contact with the crystal so that the field was perpendicular to the length of the crystal. It was shown that intense light flashes appeared when the insulated electrode became negative. The luminescence of ZnO crystals was found to be very sensitive to changes in the surrounding medium. The resistance of some of the crystals examined increases when they are placed in vacuum (10^{-2} tor). There are some crystals however for which the

Card 1/3

resistance in vacuum decreases by 20%. In this case the illumination with ultraviolet light leads to further decrease in resistance which may be due to desorption of gases from the crystal surfaces. The luminescence in vacuum is usually less than in air and is rapidly extinguished with the vapours of water, alcohol, oxygen, oil and resins. This indicates that the areas emitting light in the crystals are not far from their surfaces. In a number of experiments changes in resistance of the crystals were investigated simultaneously with the measurement of brightness of the electroluminescence. The resistance falls with the increasing tension of the field, which indicates that the atoms in the lattice, or the centres of electroluminescence, ionize. At the same time the temperature of the shining crystals reaches 850°C. There is no marked change in resistance in the region of tension in which a rapid growth of the luminescence brightness is observed. The authors postulate therefore that the simultaneous action of the field and temperature leads only to excitation of the luminescence centres. There are 2 figures and 7 references:

Electroluminescence of ZnO ...

33647
S/051/62/012/001/016/020
E075/E536

5 Soviet-bloc and 2 non-Soviet-bloc. The English-language references read as follows: Ref.1: G. Bogner, E. Mollwo. Phys. Chem. Solids, 6, 136, 1958; Ref.7: K. W. Böer, U. Kümmel. Ann. Phys., 14, 341, 1954.

SUBMITTED: June 26, 1961

Card 3/3

36527

S/051/62/012/006/010/020
E036/E418

24.3500

AUTHOR: Vereshchagin, I.K.

TITLE: Electroluminescence in ZnS phosphors excited by square pulses of various durations

PERIODICAL: Optika i spektroskopiya, v.12, no.6, 1962, 750-757

TEXT: The radiation emitted from green and blue phosphors excited by square voltage pulses has been investigated as a function of both pulse length and pulse interval, and for various combinations of pulse polarities. Previous reported experiments were confined to only small ranges of pulse lengths, but in this case the range was 0.1 μ sec to 1000 sec. The powder type green phosphors were ZnS-Cu, Pb (or ZnS-Cu, Al) prepared in H_2S or HCl at 1100°C and the blue phosphors ZnS-Cu, Ag prepared at 850 to 1000°C. The total output intensity L per pulse increased linearly with pulse length from 0.5 to 20 μ sec. Up to 1 m sec the rate of growth slowed for the green but accelerated in blue phosphors, both reaching a peak output at about 10 m sec. This coincides with the time required for complete development of the first two peaks, one of brightness L1 observed on switching on

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4

Electroluminescence in ZnS ...

the pulse and the other L_2 on switching off. Since the brightness decreased with increasing interval between pulses, it is concluded that the phosphor gradually returns to its initial state when there is no field and, in fact, L_1 is not observed during the initial pulse, in general agreement with J.F.Waymouth's results (Phys. Rev., v.95, 1954, 941). For intervals below 3 m sec, the output again decreases. In further experiments pulses of opposing polarities were applied in pairs. If the sum of the pulse amplitudes of a pair was maintained constant, the output was constant over a wide range of amplitudes. The polarity of the first pulse is immaterial. From the square pulse data the response of the phosphors to sinusoidal inputs could be predicted. Direct observation of the luminescence from localized spots within small single crystals was carried out by the method of A.M.Bonch-Bruyevich et al (Opt. i spektr., v.11, 1961, 87) and showed that the first output peak was predominant at the anode, whilst the second peak was larger in the region of the cathode. This result in particular necessitates a new model for electroluminescence. It is proposed that the phosphor has a

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n-p-n structure, the p region in the centre being due to reduced Cu concentration. With this model results can be understood in terms of electrons liberated by the applied field returning to the excitation region and recombining. The functioning of this structure is discussed qualitatively. The results of the present work were presented at the Ukrainian Conference on Physical Optics (Kiyev, February 1961). There are 10 figures.

4

SUBMITTED: May 4, 1961

Card 3/3

13502
S/051/62/013/006/023/027
E039/E120

AUTHORS: Vereshchagin, I.K., and Kosyachenko, L.A.

TITLE: On the avalanche processes in the electroluminescence of ZnS-Cu

PERIODICAL: Optika i spektroskopiya, v.13, no.6, 1962, 877-878

TEXT: The mechanism of excitation of electroluminescence in ZnS is not clear. The intensity of luminescence from single crystals of ZnS-Cu (size 30-50 μ) is investigated for alternating and pulsed voltages. Samples were chosen from powdered industrial phosphor. A higher intensity of luminescence is observed with varying voltages than with the passage of a constant current through the crystal. Current-voltage characteristics are determined for the unexcited (dark) condition and when the crystal is exposed to ultraviolet radiation. The form of these curves is independent of the polarity and is typical of the curves for semiconductor diodes. The increase in photocurrent at large voltages may be partially due to heating but can only be satisfactorily explained by the multiplication of carriers. The multiplication coefficient M for a given voltage V on the

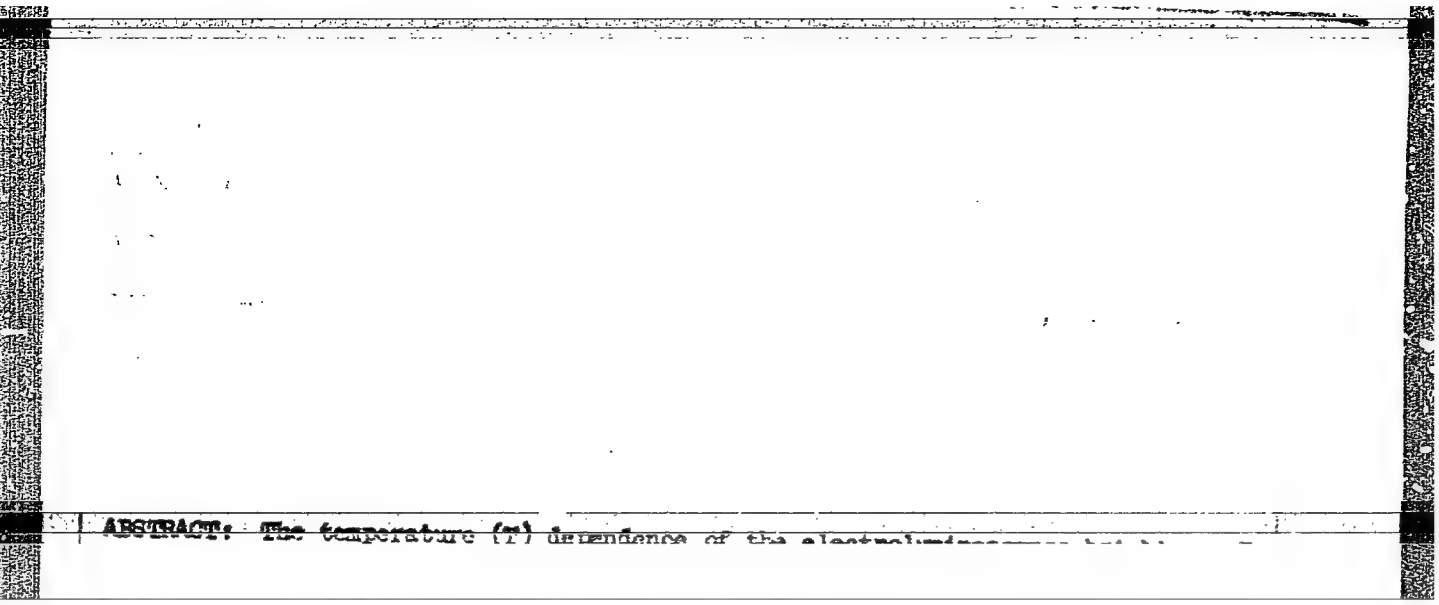
Card 1/2

On the avlanche processes in the ... S/051/62/013/006/023/027
E039/E120

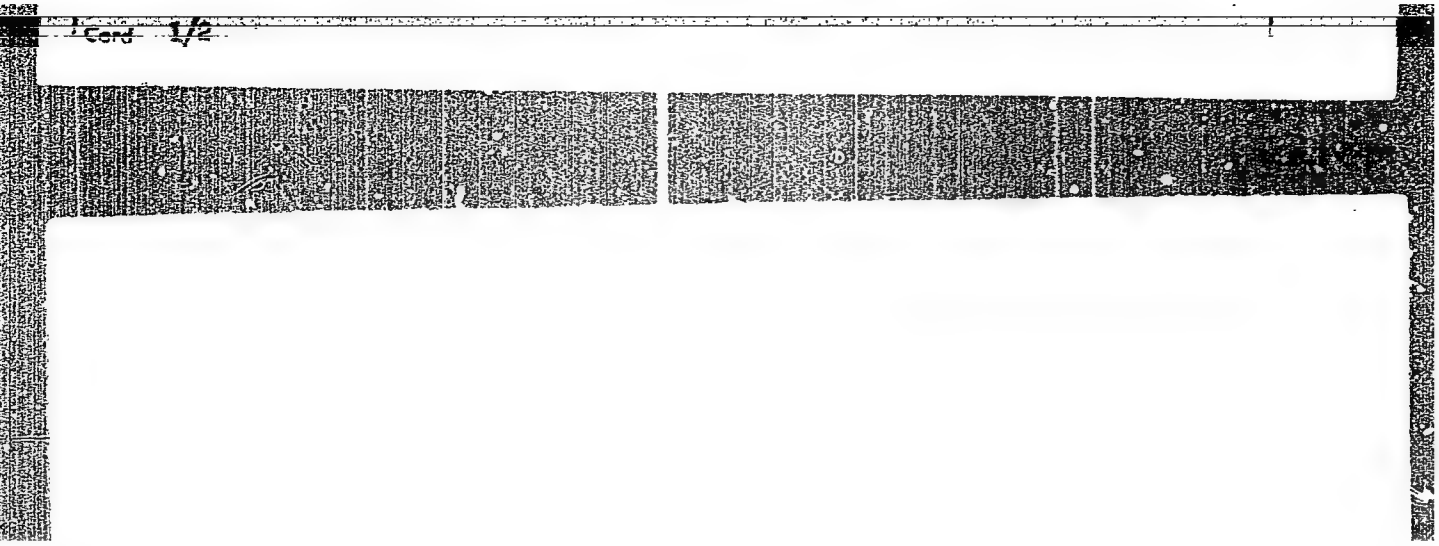
crystal is defined as the ratio of the photocurrent at V to the photocurrent at 1 - 2 V, where multiplication does not occur. Values of M are determined at a series of voltages (up to ~10 V) and the form of these curves is shown to be similar to those for (p-n) transitions in Si and Ge. Good agreement is obtained between theory and experiment. With voltages $V < 10$ the value of M and the measured current are determined by the surface barrier between the metal contact and the crystal. With $V > 10$ avalanche effects are dominant. The increase in current with voltage is faster than linear for voltages up to 200-300 V. Examination of the form of the M(V) curves suggests that the excitation mechanism is collisional ionisation.
There are 2 figures.

SUBMITTED: June 18, 1962

Card 2/2



ABSTRACT: The temperature (T) dependence of the electrolyte



APPROVED FOR RELEASE: 09/01/2001 CIA-RDP86-00513R001859420020-0"

AUTHOR: Vereshchagin, I. K.

TITLE: On cascade processes in zinc oxide

SOURCE: Ref. zh. Fizika, Abs. 9E724

REF SOURCE: Sb. Proboy dielektrikov i poluprovodnikov. M.-L., Energiya, 1964, 327-329

TOPIC TAGS: zinc oxide, cascade, impact ionization, temperature dependence, electron mobility, volt ampere characteristic, dielectric breakdown

TRANSLATION: A comparison is made of the experimental data with theory of impact ionization (II), with account taken of the temperature dependence of the rate of ionization. ZnO crystals were investigated measuring 10 x 0.3 x 0.3 mm with ρ = (1--10), ohm^{-1} cm^{-1} with electron concentration n = (2--5) x 10^{17} cm^{-3} and mobility μ = (100--300) cm^2/v-sec. The I-V characteristic of the rectifying ZnO-Ag contact in the barrier direction is presented. The breakdown occurred at a temperature of 200° near the contact. The results give [illegible] II when account is taken of the temperature dependence of the II coefficient.

SUB CODE: 20

Card 1/1

L 26493-66 EWT(1)/EWT(m)/EWP(t) IJP(c) JD

ACC NR: AP6013059 SOURCE CODE: UR/0048/66/030/004/0599/0603

AUTHOR: Vereshchagin, I. K.

ORG: None

TITLE: On the mechanism of electro- and photoelectroluminescence /Report, Fourteenth Conference on Luminescence held in Riga, 16-23 September 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 4, 1966, 599-603

TOPIC TAGS: electroluminescence, zinc sulfide, zinc oxide, silicon carbide, photoelectroluminescence

ABSTRACT: In earlier contributions by the author and collaborators (Optika i spektroskopiya, 16, 290, 1964, Ibid. 16, 651, 1964; Ibid. 18, 267, 1965 and several other publications) it was shown that different properties of electroluminescent materials such as SiC, ZnO and ZnS can be explained on the basis of the same process scheme including a stage of impact ionization in the surface barrier layer. In the present paper some of the distinctive features of the model are discussed and it is pointed out that photoelectroluminescence of ZnS:Cu can be interpreted in the framework of the same model scheme. Previous experimental studies by the author's group are invoked to demonstrate the occurrence of current carrier multiplication characteristic of impact ionization in ZnS, ZnO and SiC. The graphics give plots of the number of ionizations

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in function of the voltage on the barrier layer, dependences of the photoluminescence of ZnS phosphors on the temperature, crystal size and excitation intensity, and the voltage dependences of the electroluminescence and photoelectroluminescence intensities. The graphics show experimental points and curves calculated by means of equations based on the author's model scheme. The agreement is generally satisfactory. New experimental data support the author's assertion that the mechanism of photoelectroluminescence is basically the same as the mechanism of electroluminescence, but indicate that the photoelectroluminescence is connected with new carriers produced by the illumination and brought into the strong field region in the crystal. Orig. art. has: 3 formulas and 4 figures.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 009/ OTH REF: 002

L 26492-66 EWT(1)/EWT(m)/EWP(t) IJP(c) JD

ACC NR: AP6013060 SOURCE CODE: UR/0048/66/030/004/0604/0606

AUTHOR: Voroshchagin, I. K.; Kirichuk, A. S.

ORG: None

TITLE: Electroluminescence of silicon carbide /Report, Fourteenth Conference on Luminescence held in Riga, 16-23 September 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 4, 1966, 604-606

TOPIC TAGS: electroluminescence, silicon carbide, pn junction, crystal

ABSTRACT: Luminescence of silicon carbide induced by strong fields has been investigated by a number of authors, but in most cases the experiments involved natural crystals containing differently oriented rectifying layers both near the surface and in the volume. The present paper gives a brief description of the results obtained in studying the emission of individual p-n junctions and points of metal-SiC contact with the voltage applied in the blocking (reverse) direction. (Electroluminescence of p-n junctions biased in the forward direction has been investigated by others: L.Patrick (J.Appl. Phys., 28, 765, 1957, T.Ye.Kharlamova and G.F.Kholuyanov (Fiz. tverdogo tela, 2, 426, 1960)). It was found that the color of the emission from a back-biased junction may vary from red to green, depending on the structure of the crystal specimen and the nature of the impurities present. Typical voltage dependences of the dark

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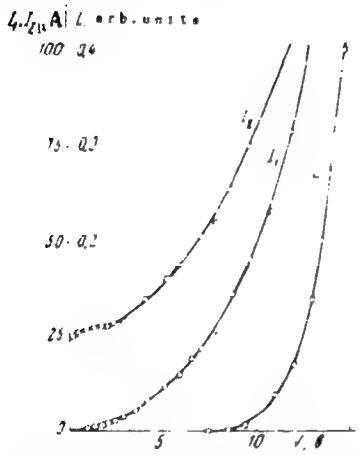
L 26492-66

ACC NR AP6013080



Voltage dependences of the dark current I_1, the photocurrent I_2 and the electroluminescence L for a reverse biased alloyed p-n junction.

current, the photocurrent and the luminescence brightness are shown in the figure. The electroluminescence does not attain saturation during short (10 microsec) pulses. Also, after termination of a voltage pulse the emission smoothly falls off for several tens of microseconds. The values of the multiplication factor M were found from the ratio of the photocurrent at the given V to the photocurrent at V = 1-2 volts, similar rising, but distinctive curves for M versus V were obtained for alloyed and diffused junctions and for an Fe-SiC contact, the curve for the alloyed junction being the steepest. The investigated diffused junctions were prepared by G.F.Kholuyanov and E.Ye.Violin; the authors are grateful to them for making these specimens available. Orig. art. has: 3 figures.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 005/ OTH REF: 003

Card 2/2

L 39772-66 EWP(k)/EWT(m)/T

ACC NR: AP6013061 SOURCE CODE: UR/0048/66/030/004/0607/0609

AUTHOR: Vereshchagin, I. K.; Kosyachenko, L. A.

ORG: None

TITLE: Kinetics of ionization processes involved in the electroluminescence of ZnS:Cu /Report, Fourteenth Conference on Luminescence held in Riga, 16-23 September 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 4, 1966, 607-609

TOPIC TAGS: electroluminescence, zinc sulfide, impact ionization, luminophor

ABSTRACT: In a series of earlier publications one of the authors (I.K.Vereshchagin) proposed and discussed an electroluminescence mechanism in which the initial stage consists of impact ionization in the surface layer. In the present paper it is noted that according to the data of other investigators polarization processes are also involved in the electroluminescence of ZnS:Cu. It has also been shown that the main luminescence is produced incident to return of electrons to the ionized centers at the instant of cutoff of the voltage pulse, so that the strength S of the flash at cutoff characterizes the number of ionization events that occurred during the period of the pulse. Curves are adduced for the variation of S with the pulse duration t for three different intervals between the uniform duration square pulses for EL-510 phosphor (a zinc sulfide electroluminophor). With increase of the interval between pulses from a

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few milliseconds to several seconds the light sum emitted upon cutoff changes noticeably which indicates that there obtains in the phosphor a persistent polarization, which reduces the value of the effective voltage acting during the pulse and which gradually decreases during the interval between pulses. With a sufficiently long interval (about 10 sec) between pulses the luminophor has time to return to the initial state; in this case replicated flashes are observed and the voltage-on flash is some 15-20 times weaker than the cutoff flash. The nonlinearity of the S versus pulse duration curve indicates that the number of ionizations L per unit time differs at different instants in the course of the pulse: L decreases with time. An equation is adduced for L in terms of the voltage V_0 on the barrier; this equation has three constants, which can be inferred from experimental data, and is based on the assumption of impact ionization. Experiments were undertaken to determine the true value of the voltage on the barrier; these involved use of secondary short pulses: brief stronger pulses on the main pulse as a pedestal. Satisfactory agreement is obtained between the values obtained in this manner and one of the $V_0 = f(t)$ curves deduced from the $S = f(t)$ curves. Thus, on the basis of the impact ionization mechanism and taking into account polarization processes it is feasible to explain the dependence of the brightness of ZnS:Cu electroluminescence on the duration of square voltage pulses. Presumably this dependence is a significant factor in determining the frequency characteristics of electroluminescence under excitation by an alternating voltage. Orig. art. has: 4 formulas and 3 figures.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 002/ OTH REF: 002

L 42887-66 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AF6018448 SOURCE CODE: UR/0051/66/020/006/1066/1073

70
69
B

AUTHOR: Vereshchagin, I. K.

ORG: none

TITLE: Electroluminescent properties of individual particles of polycrystalline samples of ZnS-Cu

SOURCE: Optika i spektroskopiya, v. 20, no. 6, 1966, 1066-1073

TOPIC TAGS: electroluminescence, luminescence, luminescence center, luminescent crystal, luminescent material, luminophor, semiconductor carrier, carrier density

ABSTRACT: The relative intensity and voltage dependence of electroluminescence in several specimens of individual electroluminophor particles with a mean size of 95 μ were investigated. The experiments included particle configurations in which the particles were touching each other, were in contact with the electrodes, or were completely isolated. It was shown that for a given applied voltage, the intensity of luminescence in the contacting particles is higher by a factor of 15 to 25 than the isolated particles. The intensity of electroluminescence due to a layer of luminophor is empirically expressed by

$$B \sim \exp\left(-\frac{b_1}{\sqrt{V}}\right),$$

UDC: 535.376

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where b_1 is a constant and V is the applied voltage. This expression was found to be inapplicable to the luminescence of individual particles. A new realization was derived which reflects the shock mechanism of electroluminescence by individual particles:

$$B = PL = PI_1V_b'a\exp\left(-\frac{b}{V_b}\right)\times\left[1-a\exp\left(-\frac{b}{V_b}\right)\right]^{-1},$$

where P is the probability of recombination resulting in radiation, L is the number of ionizations per second, V_b is the potential in the barrier region where the ionization occurs, I_1 is the current across the barrier for V_b = 1 volt, and a and b are parameters reflecting the intensity of ionization in a given substance for certain barrier characteristics. The potential drop across an individual crystal can be expressed by

$$V_1 = V_a + I_1RV_b'M, \quad \text{where} \quad M = \left[1-a\exp\left(-\frac{b}{V_b}\right)\right]^{-1}.$$

where R is the volume resistance of the crystal. The experiments were carried out by placing pairs of particles in a viscous liquid resin contained between two metal electrodes forming a capacitor. AC voltage of 2 to 20 KHz was used for excitation. The authors thank L. A. Kosyachenko for assisting in certain measurements. Orig. art. has: 6 figures.

SUB CODE: 20/ SUBM DATE: 03Dec64/ ORIG REF: 008/ OTH REF: 005

L 04823-67 EWT(1) IJP(c)
ACC NR: AP6026974 SOURCE CODE: UR/0051/66/021/002/0204/0210

42
B

AUTHOR: Vereshchagin, I. K.

ORG: none

TITLE: Effect of crystal size on the energy yield of electroluminescence

SOURCE: Optika i spektroskopiya, v. 21, no. 2, 1966, 204-210

TOPIC TAGS: electroluminescence, zinc sulfide, luminophor, PARTICLE SIZE

ABSTRACT: The effect of the particle size of the EL510 (ZnS-Cu) luminophor with green luminescence on the voltage dependence of the yield and its maximum value was studied at room temperature. In addition to their applied importance, such measurements permit one to obtain a number of characteristics pertaining to the mechanism of luminescence excitation and to evaluate the maximum possible yield theoretically. The obtained dependences of the maximum yield and corresponding voltage on the crystal size (7, 10, 18 and 21.5 μ) are compared with results of calculations based on a model including an impact ionization mechanism. The maximum yield of electroluminescence which can be obtained in the given excitation mechanism is evaluated. Author is grateful to O. N. Kukuruz, who participated in the work. Orig. art. has: 5 figures and 6 formulas.

SUB CODE: 20/ SUBM DATE: 25Mar65/ ORIG REF: 011/ OTH REF: 008

Card 1/1 UDC: 535.376

ACC NR: AP7004914 (N) SOURCE CODE: UR/0109/66/011/012/2261/2262

AUTHOR: Vereshchagin, I. K.; Kirichuk, A. S.

ORG: none

TITLE: Effect of temperature on the shock ionization coefficient in silicon carbide

SOURCE: Radiotekhnika i elektronika, v. 11, no. 12, 1966, 2261-2262

TOPIC TAGS: silicon carbide, impact ionization, high temperature effect, PN JUNCTION, TEMPERATURE DEPENDENCE

ABSTRACT: An investigation was made of ionization processes generated by a strong field in the p-n junctions of silicon carbide at temperatures above room temperature. The junctions were prepared by the boron diffusion method, or by addition of aluminum and silicon at 1700°C to α-SiC crystals with electron conductivity. With the application of reverse voltages $V > 3v$ an increase was observed of photocarriers generated in crystals whose p-side was illuminated by a mercury-quartz lamp. The multiplication factor M was found from the relation of the photocurrent at a given V and of the photocurrent at $V < 2v$, when the generation of electron-hole pairs on account of shock ionization of the lattice under stationary conditions is not possible. The ionization number N for one electron which has crossed the barrier region can be obtained from the relationship $N = 1 - M^{-1}$. The dependence of N on the voltage at the d-wide junction when coefficients of shock ionization are equal for electrons and holes (α), and for an average field strength in the junction $E \sim V_0$, may be described by the formula $N = \alpha d = a \exp(-b/V_0)$, where a and b are parameters depending for a given

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UDC: 621.382

ACC NR: AP7004914

sample on the temperature. Data obtained for a diffusion junction are shown in Fig. 1. Orig. art. has: 3 formulas and 1 figure. [JP]

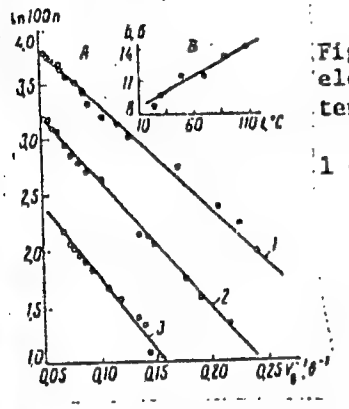

Fig. 1. The dependence of the ionization number per one electron (N) on voltage in the junction (V_0) at various temperatures (A); the dependence of b on temperature (B):

1 - 30°C; 2 - 70°C; 3 - 110°C.

SUB CODE: 20/ SUBM DATE: 28Mar66/ OTH REF: 007/ SOV REF: 004/

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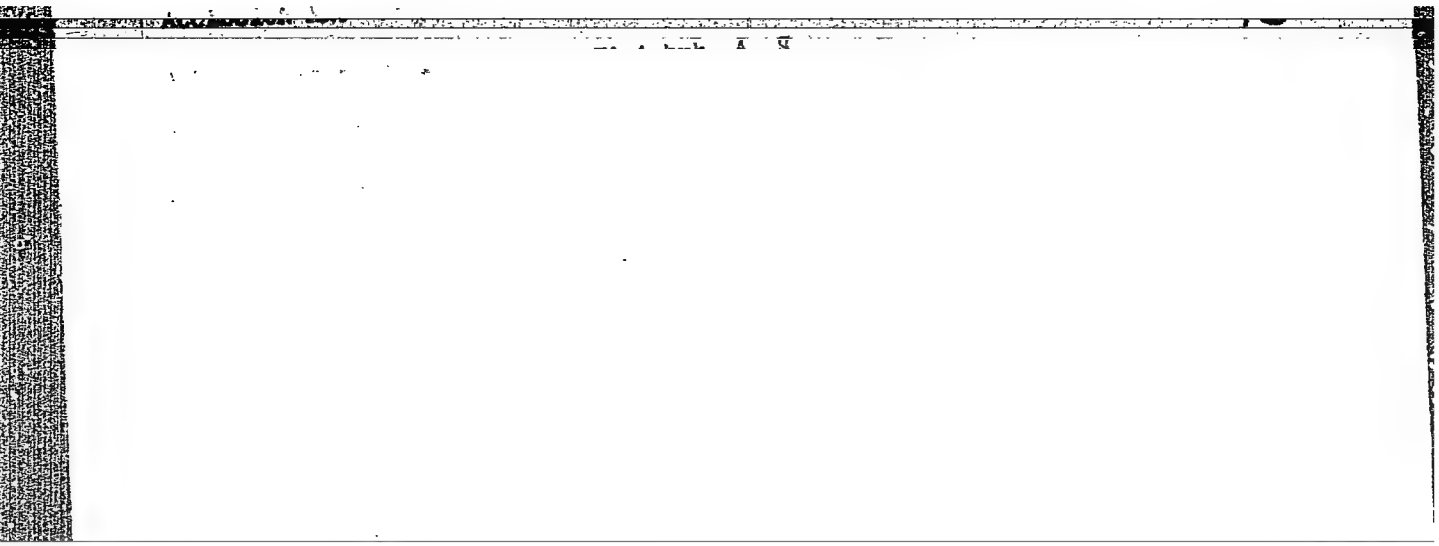

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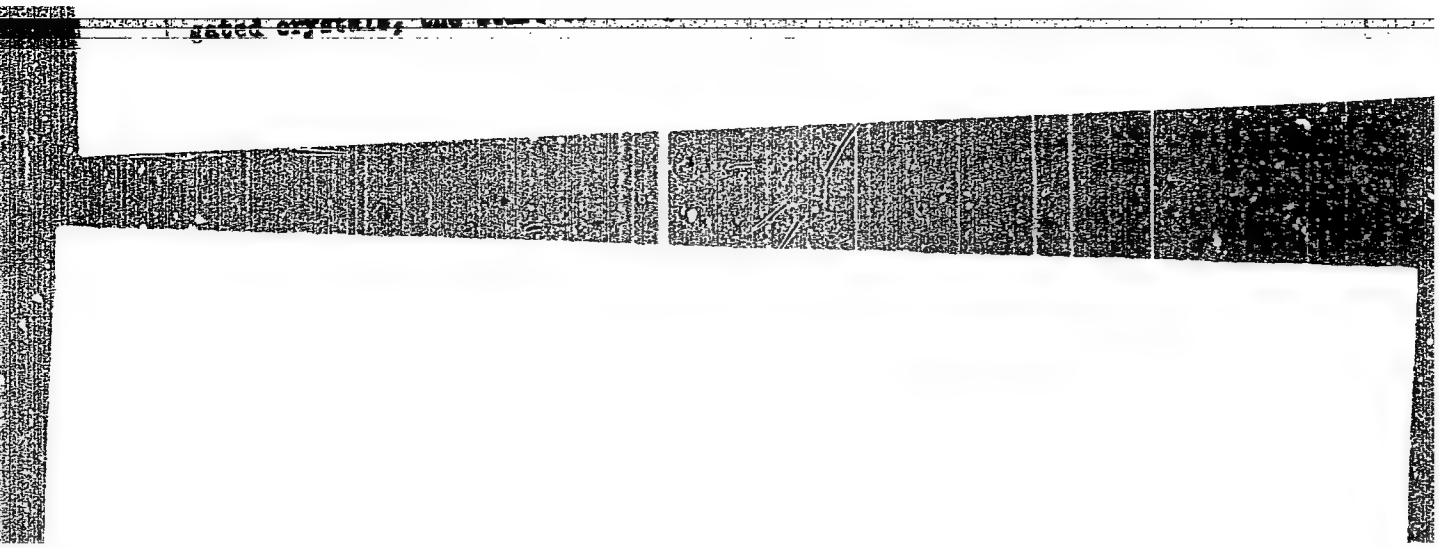

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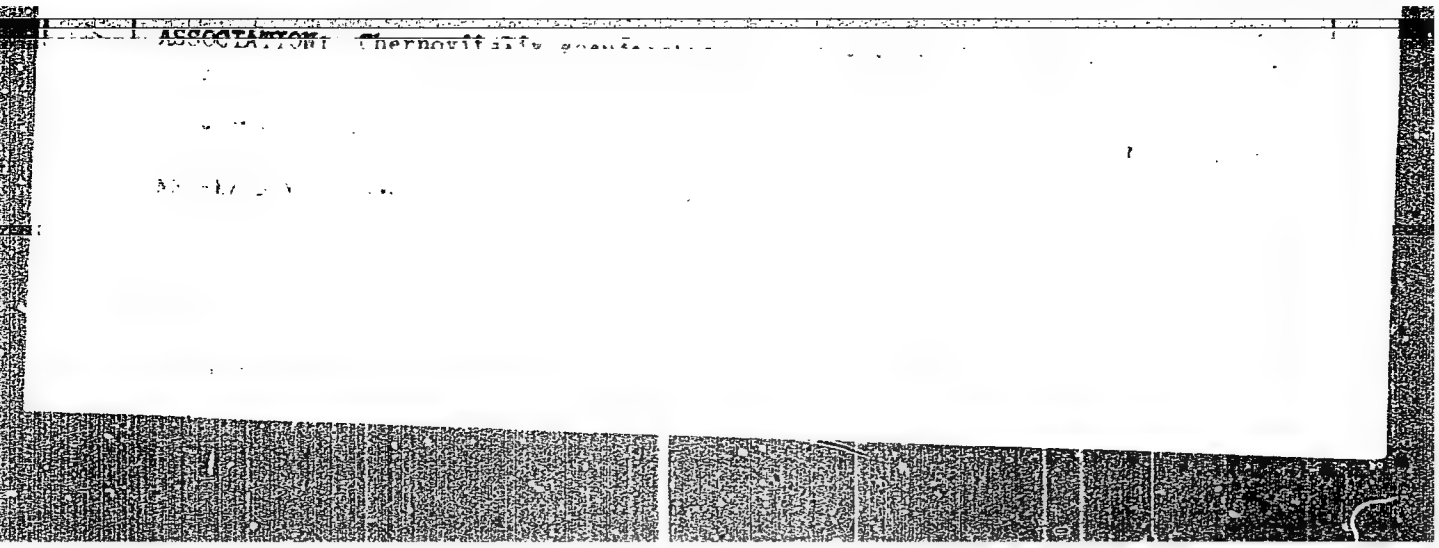

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VERESHCHAGIN, I.K. [Vereshchahin, I.K.]; KOSYACHENKO, L.A.

Effect of intercrystalline contact on the brightness of the electroluminescence of zinc sulfide. Ukr. fiz. zhur. 9 no.10: 1145-1146 O '64 (MIRA 18:1)

1. Chernovitskiy gosudarstvennyy universitet.

VEREKHOVAGIN, I.K.

Energy yield of electric luminescence. Opt. i spektr. 18 no.2:267-274 F '65. (MIRA 18:4

VERESHCHAGIN, I.K.

Temperature dependence of electroluminescence of medium intensity.
Opt. i spektr. 16 no. 4:651-658 Ap '64. (MIRA 17:5)

VERESHCHAGIN, I.K.

Dependence of the mean electroluminescence intensity on the voltage.
Opt. i spektr. 16 no.2:290-296 F '64. (MIRA 17:4)

VERESCAGIN, I.K. [Vereshchagin, I.K.]; KOSIACENKO, L.A.

On avalanche processes in electroluminescence of single ZnS-Cu crystals. Chekhosl fiz zhurnal 13 no.2:85-88 '63.

1. State University, Chernovtsy, U.S.S.R.

VERESCAGIN, I.K. [Vereshchagin, I.K.]; DRAPAK, I.T.

Electroluminescence of ZnO monocrystals. Chekhosl fiz zhurnal 13 no.3:173-181 '63.

1. Tschernowitzer Staatliche Universitat, Tschernowice, UdSSR.

VERESHCHAGIN, I. K.; KOSYACHENKO, L. A.

Avalanche processes in the electroluminescence of ZnS-Cu.
Opt. i spektr. 13 no.6:877-879 D '62. (MIRA 16:1)

(Phosphors) (Photoelectricity)

AID P -5126

Subject : USSR/Aeronautics - static interferences

Card 1/1 Pub. 135 - 11/26

Author : Vereshchagin, I. M., Eng.-Capt.

Title : Fight with static in radio reception

Periodical : Vest. vozd. flota, 10, 60-63, O 1956

Abstract : The problems of interferences by atmospheric electricity in radio reception and various means by which to decrease the volume of electrostatic charges of the aircraft are discussed by the author. One photo. The article is of informative value.

Institution : None

Submitted : No date

VERESHCHAGIN, I.P., inzh.

Analyzing errors in the calculation of transient processes in lines with distributed parameters by developing the input resistance into an exponential series. Izv.vys.ucheb.zav.; energ. 3 no.1:30-38 Ja '60. (MIRA 13:1)

1. Moskovskiy ordena Lenina energeticheskiy institut. Predstavlena kafedroy tekhniki vysokikh napryazheniy.
(Electric currents) (Transients (Electricity))

SIROTINSKIY, Leonid Ivanovich. Prinimali uchastiye: RAZEVIG, D.V., dotsent; VERESHCHAGIN, I.P., aspirant. PERTIK, S.M., retsenzent; GONCHARENKO, G.M., red.; KORUZEV, M.N., tekhn.red.; LARIONOV, G.Ye., tekhn.red.

[Technology of high voltages] Tekhnika vysokikh napriazhenii. Moskva, Gos.energ.izd-vo. Pt.3, no.1. [Wave processes and internal overvoltages in electrical systems] Volnovye protsessy i vnutrennie perenapriazheniia v elektricheskikh sistemakh. 1959. 365 p. (MIRA 12:9)
(Electric engineering)

VERESHCHAGIN, I. P., Cand Tech Sci -- (diss) "Some calculation methods of stress increases in transition conditions in electrical transmission at 400-500 kv." Moscow, 1960. 23 pp; (Ministry of Higher and Secondary Specialist Education RSFSR, Moscow Order of Lenin Power Inst); 250 copies; free; (KL, 26-60, 134)

VERESHCHAGIN, I.P., inzh.

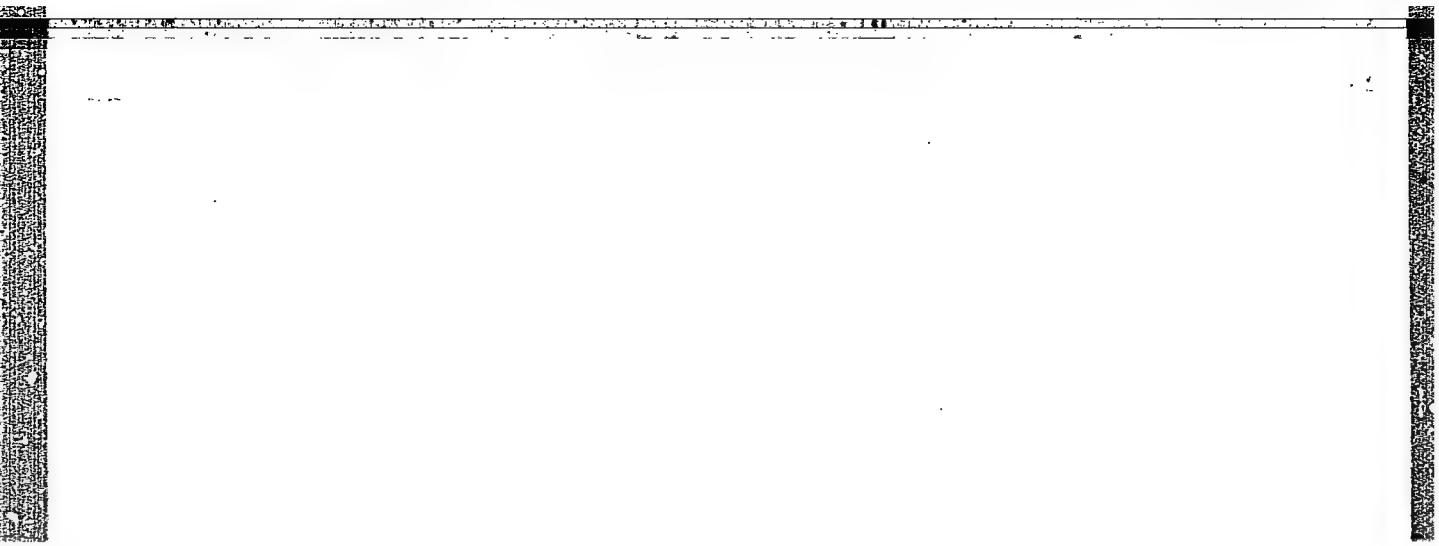
Calculation of transient processes in transmission lines by placing an input resistance in the power series. Izv.vys. ucheb.zav.; energ. 2 no.11:26-35 N '59. (MIRA 13:4)

1. Moskovskiy ordena Lenina energeticheskiy institut. Predstavlena kafedroy tekhniki vysokogo napryazheniya.
(Electric lines) (Transients (Electricity))

VERESHCHAGIN, I.P.

Calculating transients in electric power lines with consideration of nonlinearity of the magnetizations characteristics of transformers. Nauch.dokl.vys.shkoly; energ. no.4:111-122 '58. (MIRA 12:5)

1. Rekomendovana kafedroy tekhniki vysokikh napryazheniy Moskovskogo energeticheskogo instituta.
(Transients (Electricity)) (Electric lines)
(Electric transformers)



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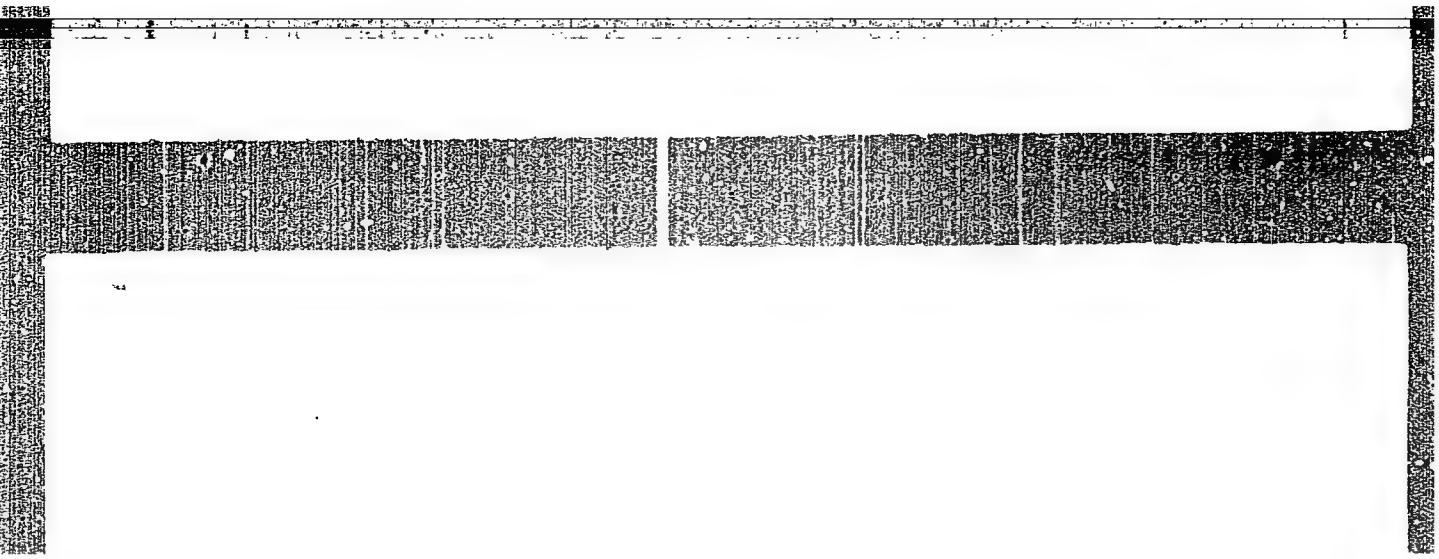

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ASSOCIATION none

VERESHCHAGIN, K.I., inzh.

Corrosion resistance of cast iron and steel in aggressive gas media. Khim. i neft. mashinostr. no.1:34-35 '65.
(MIRA 17:12)

VFRN... [illegible] L.A., inzh.; KOYCHUK, L.M., inzh.

Contactless devices for dynamic braking of asynchronous electric motors. Energ. i elektrotekh. prom. no.3:38-40 Jl-S '65.
(MIRA 18:9)

VERESHCHAGIN, L.A., inzh.

Transducer of linear desplacements to the speed of rotation.
Priborostroenie no.4:13-14 Ap '65.
(MIRA 18:5)

TUNIK, A.A.; VERESHCHAGIN, L.A.

How to realize summation with averaging (formulation of the problem).
Avtomatyka 9 no.6:72-77 '64. (MIRA 18:1)

ACCESSION NR: AP4020318 S/0302/64/000/001/0045/0047

AUTHOR: Vereshchagin, L. A.; Rudny*y, N. M. (Candidate of technical sciences)

TITLE: Potential logical inverter without switching elements

SOURCE: Avtomatika i priborostroyeniye, no. 1, 1964, 45-47

TOPIC TAGS: logical inverter, NOT circuit, OR circuit, AND circuit, contactless motor control, switchless motor control

ABSTRACT: A simple equal-arm bridge circuit (see Enclosure 1) is suggested as a logical inverter. If $U_0 = U_i$, the output voltage is zero; if $U_i = 0$, the output voltage is $U_0/2$; the circuit then functions as a logical NOT scheme. If two input voltages are applied to both diagonals, the circuit functions as an OR gate. By reversing the polarity of one of the input voltages, the circuit can be turned into an inverted AND gate. Simplicity, reliability, and high speed (suitability for

Card 1/3?

ACCESSION NR: AP4020318

h-f operation) are seen as advantages of the circuit. The dynamic braking of an electric motor is suggested as one of its possible uses. It is claimed that an EDG-1 type motor (loaded with a synchronous generator) was decelerated by the above NOT circuit, from 2,730 rpm to zero, in 3 revolutions or 0.14 sec, while the same motor made 90 revolutions in 6.7 sec in stopping without the NOT circuit. Orig. art. has: 2 figures.

ASSOCIATION: none

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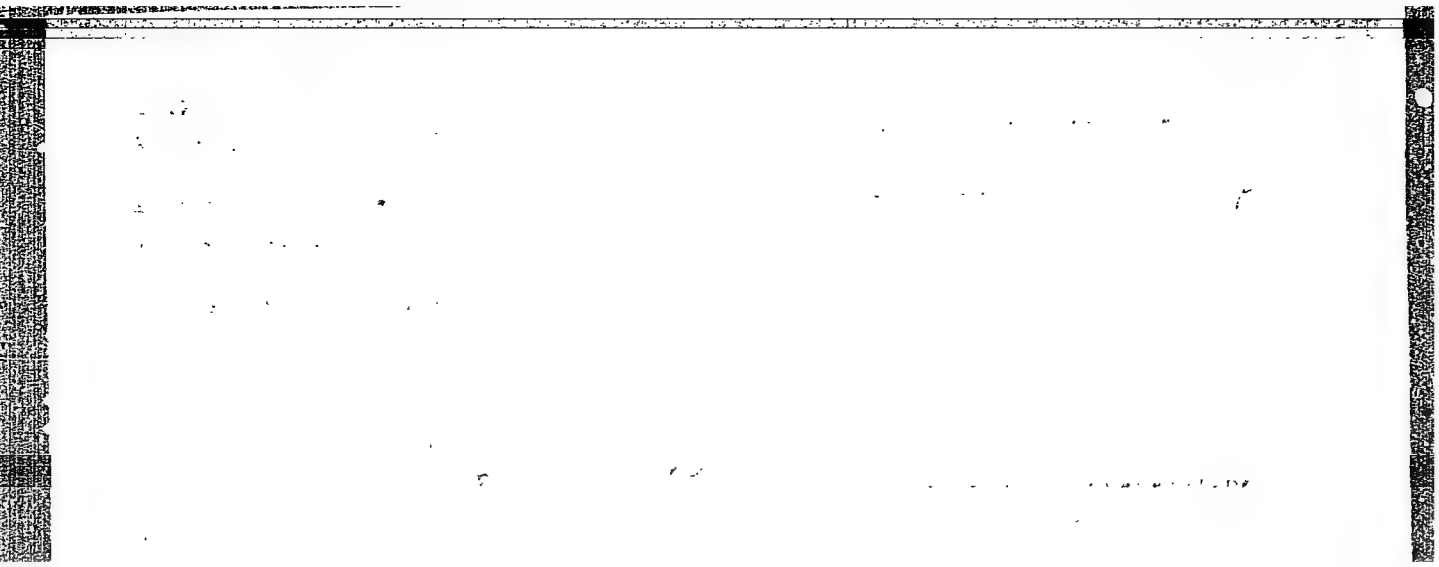

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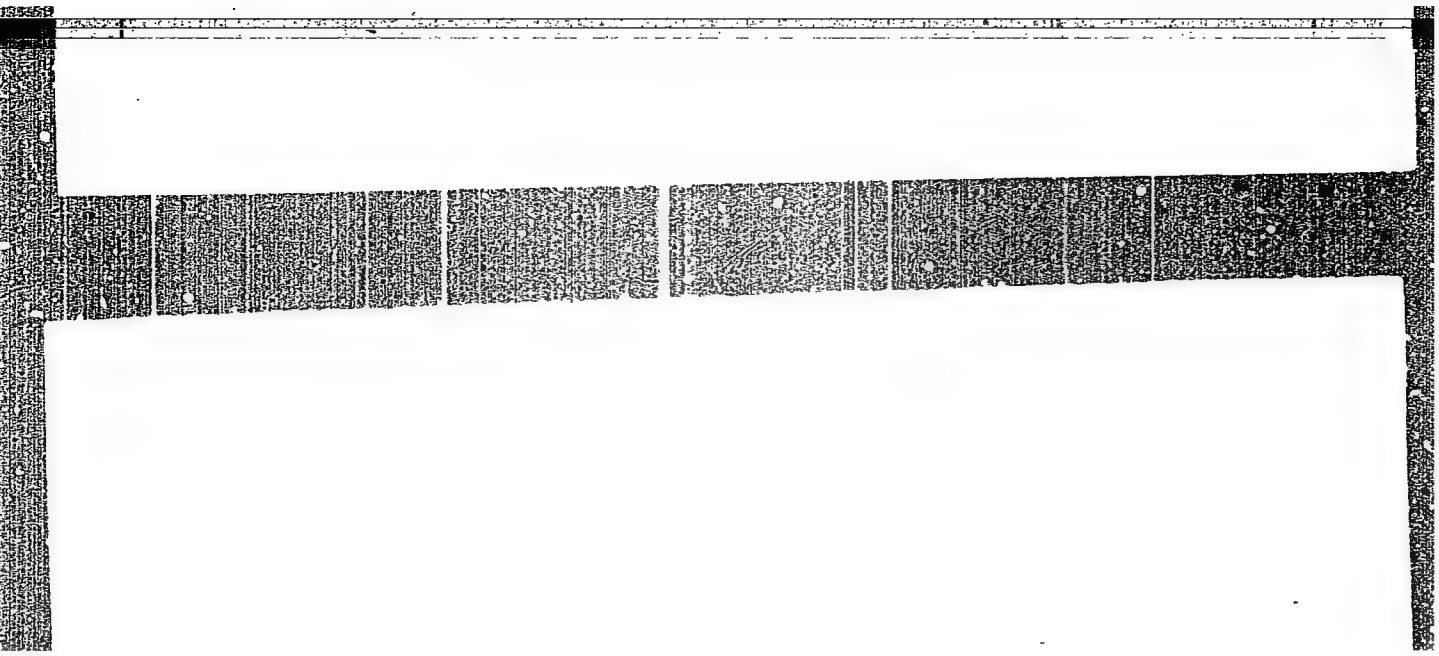

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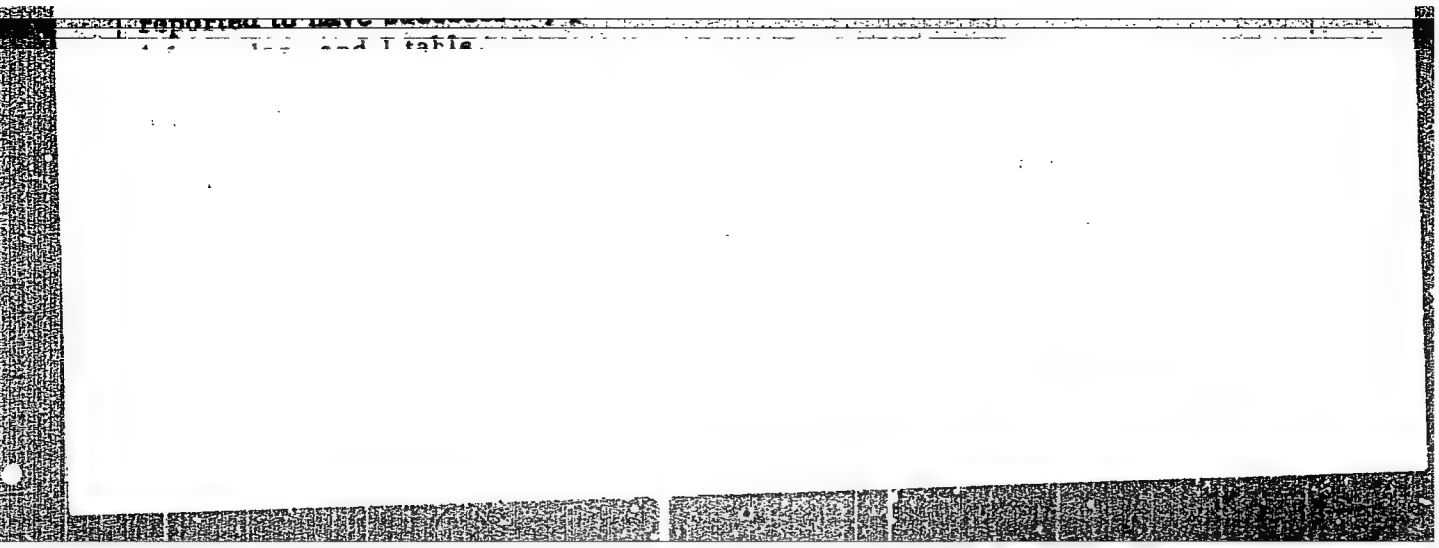

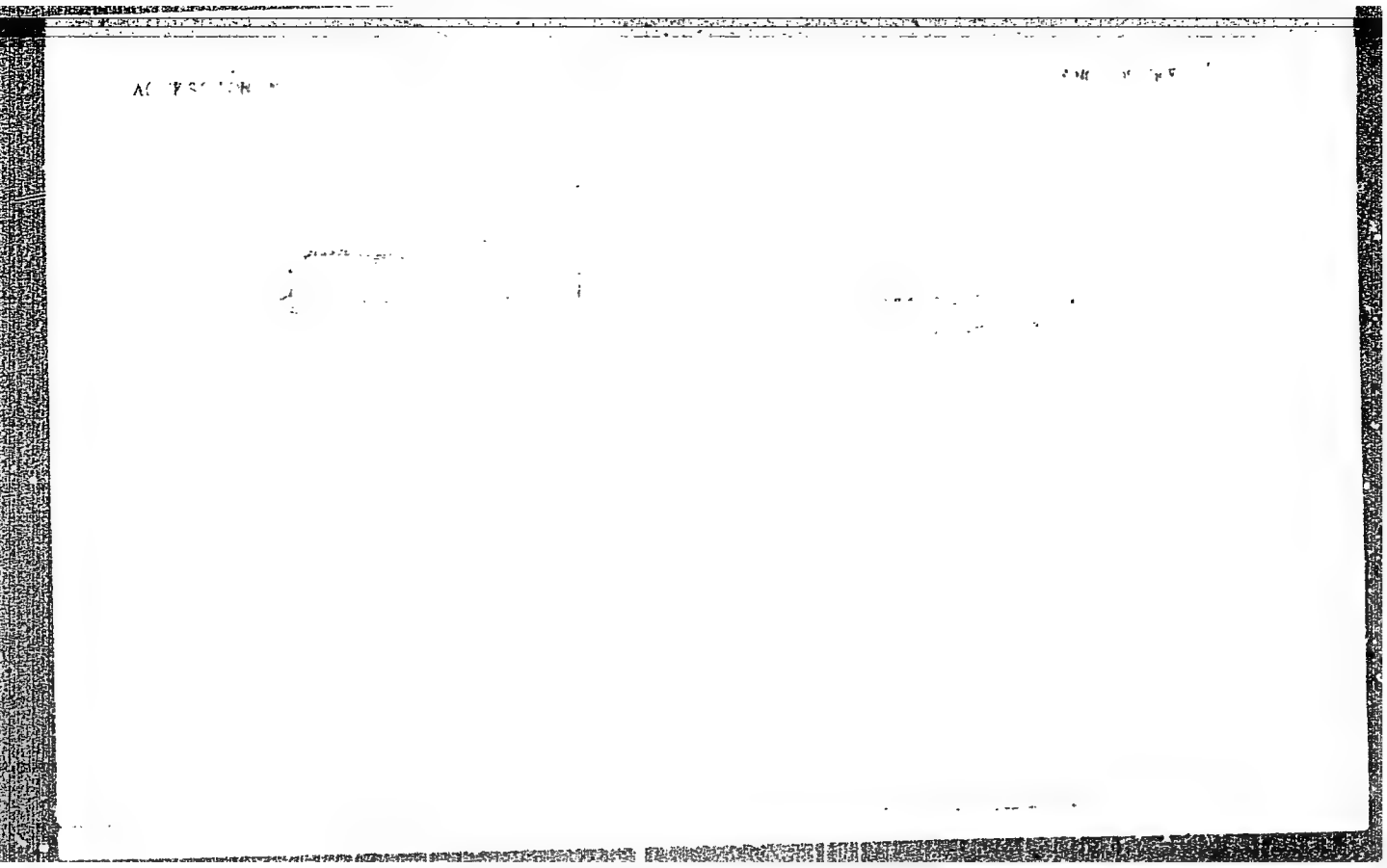

L 2221-66 EWT(l)/EWP(e)/EWP(t) IJP(c) JD/WW/GG

A. [illegible] Vereshchagin, [illegible]
Burdina, K. P.

ORG: Institute of High-Pressure Physics, Academy of Sciences SSSR (Institut fiziki [illegible]

TITLE: Obtaining dense germanium and silicon by simultaneous application of high pressure and shear stress

SOURCE: AN SSSR. Doklady, v. 168, no. 2, 1966, 314-315

TOPIC TAGS: germanium, silicon, phase transition, high pressure research, crystal structure

ABSTRACT: A study was made of the high pressure and shear stress-induced phase transitions in germanium and silicon and of the crystal structure of dense forms, Ge_{II} and Si_{III}, which were obtained by simultaneous application of high-pressure and shear stress. Earlier, this highly sensitive method of detecting phase transitions enabled Western scientists to discover Ge_{II} and Si_{III}, but the limits of stability of these dense forms remained unknown. The experiments were conducted in an apparatus developed at the Institute of High-Pressure Physics, Academy of Sciences USSR [L. F. Vereshchagin, V. A. Shapochkin and Ye. V. Zubova, Pribory i tekhnika eksperimenta, no. 5, 89 (1960)]. Phase transitions were detected by recording discontinuity

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ACC NR: AP6015608

in the magnitude of shear stress. X-ray diffraction patterns of the samples after relaxation of pressure showed the presence of a tetragonal Ge_{III} phase and a body-centered cubic $Si_{I,I}$ phase in the samples which were submitted to 100 and 170 kbars, respectively, for less than 3 hr at room temperature and under simultaneous shear stress. The earlier determined crystal structure and lattice parameters of Ge_{III} and Si_{III} were confirmed. A complete transformation of Ge and Si samples into dense forms was achieved by application of shear stress in 25 steps and subsequent 3 hr retention under pressure and shear stress. [JK]

SUB CODE: 20/ SUBM DATE: 18Feb66/ ORIG REF: 001/ OTH REF: 004/ ATD PRESS: 4257

L 25692-66 EWT(l)/EWT(m)/EPF(n)-2/EWA(d)/EWP(k) IJP(c) JD/WW/JW/LHB/GG

ACC NR: AP6002711 SOURCE CODE: UR/0056/65/049/006/1728/1732

AUTHOR: Vereshchagin, L. F.; Kabalkina, S. S.; Kotilevets, A. A.

ORG: Institute of High Pressure Physics, Academy of Sciences SSSR (Institut fiziki vysokikh davleniy Akademii nauk SSSR)

TITLE: Phase transition in MnF_2 at high pressures

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 6, 1965, 1728-1732

TOPIC TAGS: phase transition, metastable phase, x ray analysis, manganese compound, fluoride, crystal lattice structure, pressure effect

ABSTRACT: This is a continuation of earlier work on the same subject, with an aim at determining the conditions under which MnF_2 with an α-PbO_2 structure is formed. To this end, the effect of high pressure on the structure of MnF_2 was measured at pressures up to 80 kbar. Whereas in the earlier investigation the x-ray structure could be determined only after removal of the pressure, the method in the present study made it possible to obtain x-ray patterns directly at high pressures. The method is described elsewhere (S. S. Kabalkina and L. F. Vereshchagin, DAN SSSR v. [illegible], 1963). The results show that at pressures [illegible] kbar the initial phase of MnF_2 with rutile structure experiences a reversible phase transition. It is assumed on the basis of the data that the high pressure MnF_2 phase has a distorted structure of the CaF_2 type, which is close to the structure of the tetragonal ZrO_2 modification. After removal of the pressure, a metastable phase with a structure of the α-PbO_2 type

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ACC NR: AP6002711

is formed from the phase which is stable at high pressure. The metastable phase is thus not the high-pressure phase, as was previously assumed. Orig. art. has: 2 figures and 2 tables.

SUB CODE: 20/ SUBM DATE: 12Jul65/ ORIG REF: 004/ OTH REF: 006

L 25789-66 EPF(n)-2/EWP(k)/EWT(l) ... WW ...
ACC NR ...

AUTHOR: Vereshchagin, L. F. (Corresponding member AN SSSR); Kabalkina, S. S.; Lityagina, L. M.

ORG: Institute of High-Pressure Physics, AN SSSR (Institut fiziki vysokikh davleniy AN SSSR)

TITLE: Investigation of the effect of high pressure on the structure of tin oxide

SOURCE: AN SSSR. Doklady, v. 163, no. 2, 1965, 326-328

TOPIC TAGS: van der Waals force, tin compound, crystal structure

ABSTRACT: Ordinarily SnO has a PbO-type structure, in which the O atoms in the SnO structure form square lattices and the tin atoms are either above or under the centers of the squares. Thus, each O atom is in the center of a tetrahedron of Sn atoms and each Sn atom occupies the vertex of a tetragonal pyramid based on a square of four O atoms.

Since SnO has a plane of O atoms between two planes of Sn atoms, it has a layered structure bound together by weak van der Waals forces and by ionic and covalent bonds.
The authors made x-ray studies of the SnO structure at room temperature and under pressures up to 100 kbar. The experiments showed that SnO undergo...

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L 25789-66

ACC NR: AP6015920

a reversible phase transition under high pressure (40 to 50 kbar) with six lines appearing that are identical to the wurtzite-type structure. The cubic packing of the tin atoms is rearranged into a denser hexagonal packing under pressure, while the corresponding polygon, the tetragonal pyramid, becomes a tetrahedron. It can be assumed that under even higher pressure the wurtzite structure will be changed into an NaCl-type structure. Orig. art. has: 3 figures and 1 table. [JPRS]

SUB CODE: 20, 07 / SUBM DATE: 06Apr65 / ORIG REF: 002 / OTH REF: 006

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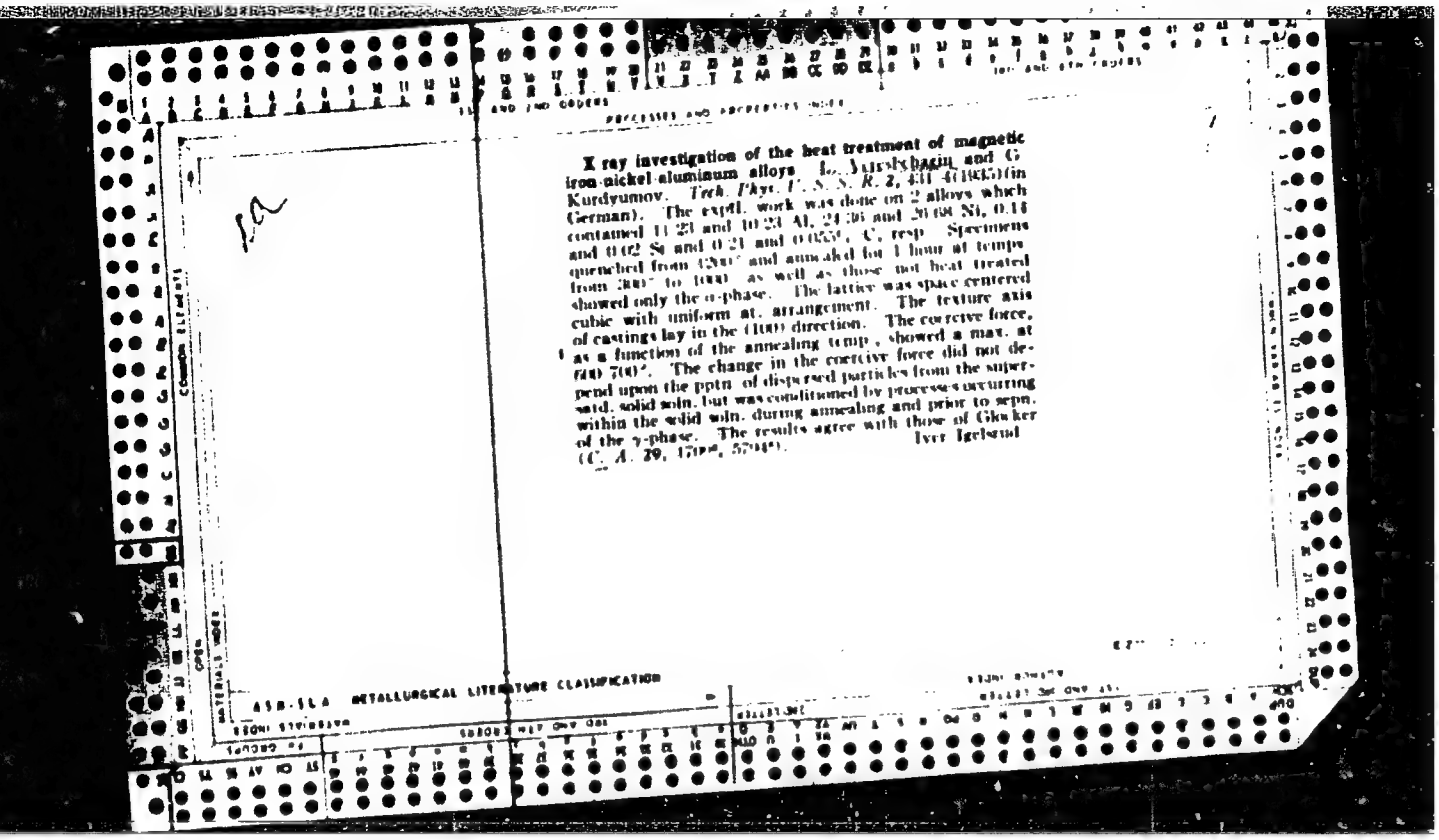
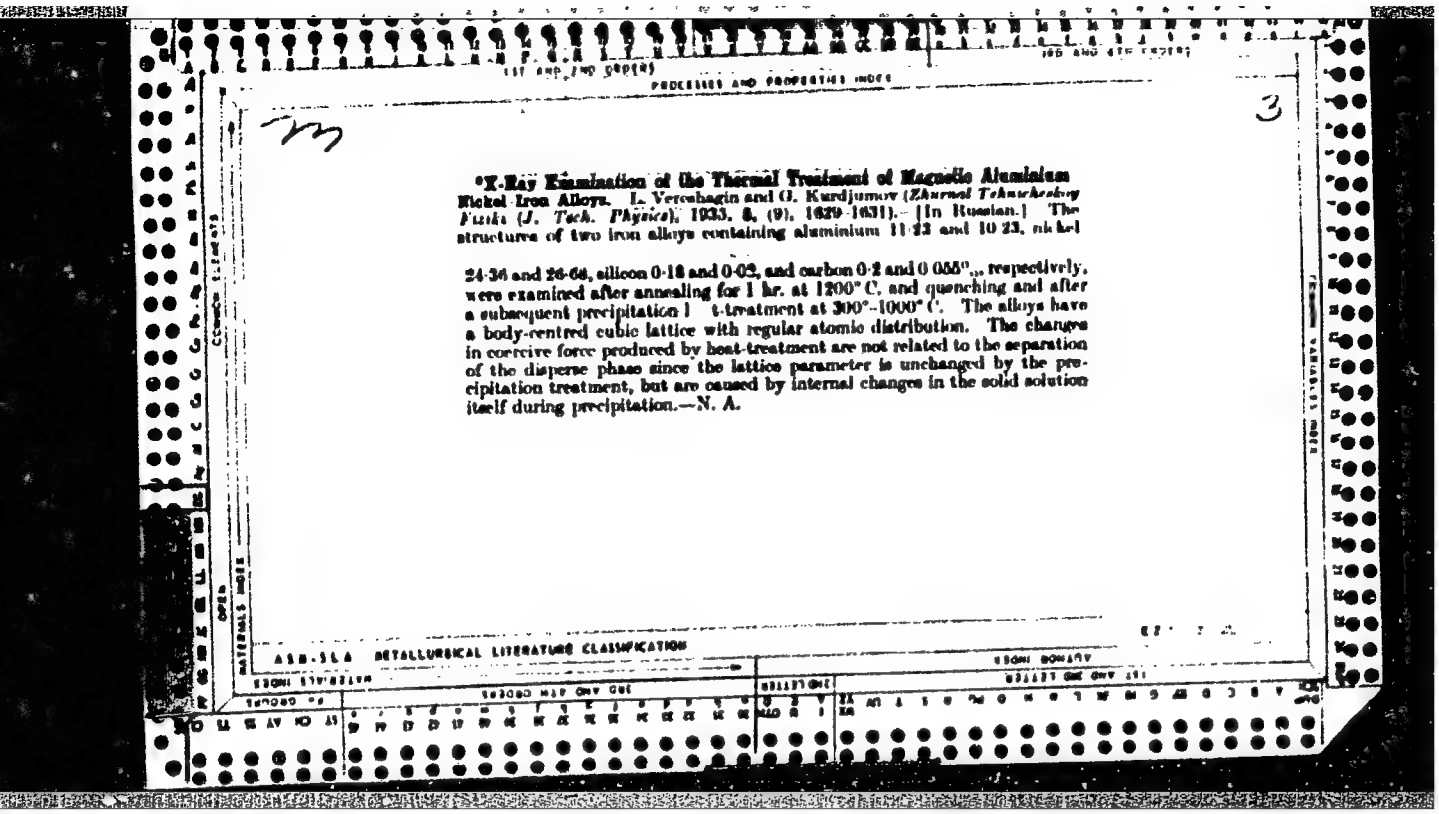


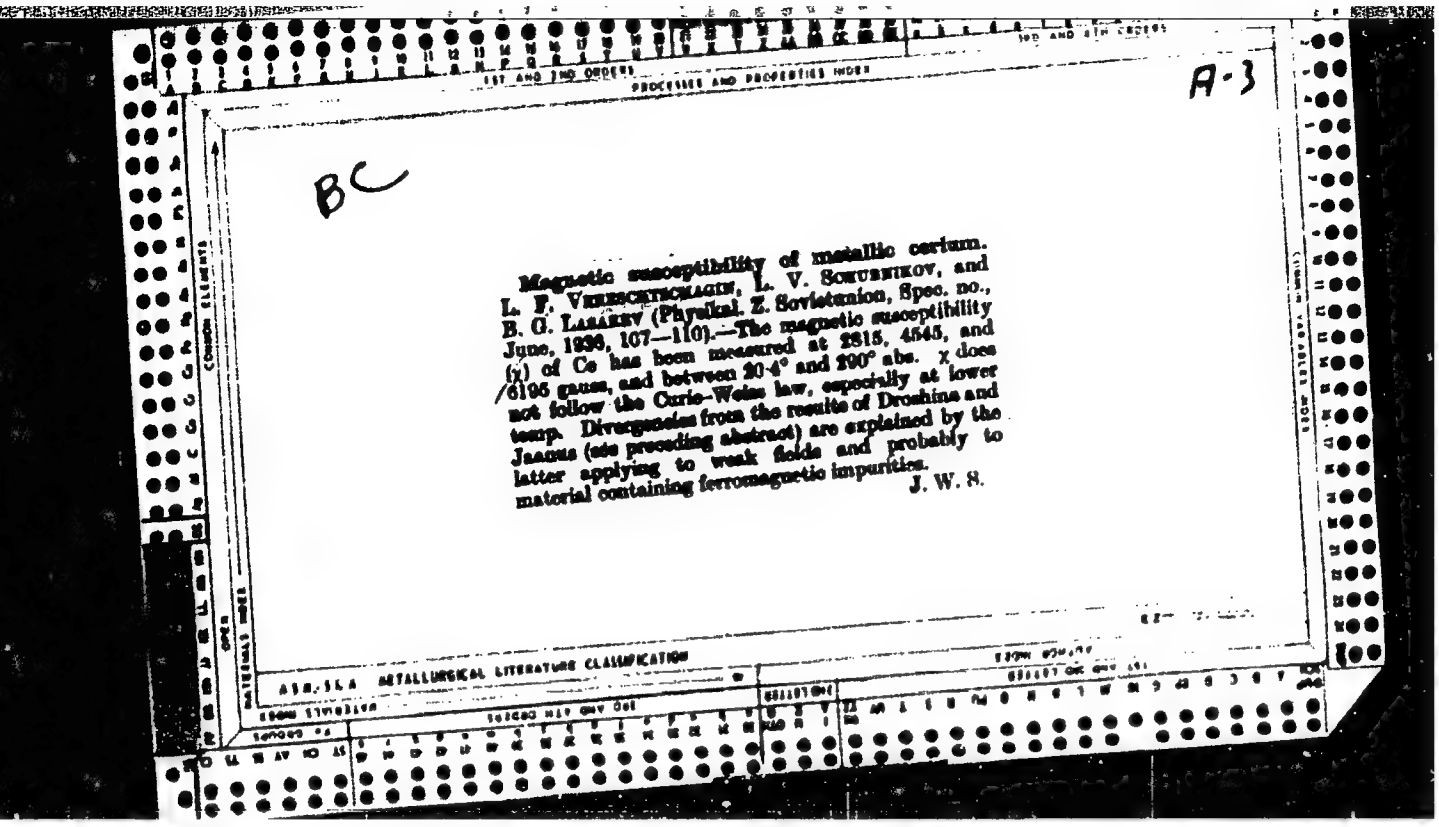
X ray investigation of the heat treatment of magnetic iron-nickel-aluminum alloys. L. Larskhagin and G. Kurdyumov. *Tech. Phys. U. S. S. R.* 2, 431-47(1935)(in German). The exptl. work was done on 2 alloys which contained 11.23 and 10.23 Al, 24.36 and 20.68 Ni, 0.14 and 0.02 Si and 0.21 and 0.055% C, resp. Specimens quenched from 1200° and annealed for 1 hour at temps. from 300° to 1000° as well as those not heat treated showed only the α-phase. The lattice was space centered cubic with uniform at. arrangement. The texture axis of castings lay in the (100) direction. The coercive force, as a function of the annealing temp., showed a max. at 600-700°. The change in the coercive force did not depend upon the pptn. of dispersed particles from the supersatd. solid soln. but was conditioned by processes occurring within the solid soln. during annealing and prior to sepn. of the γ-phase. The results agree with those of Glocker (*C. A.* 29, 1705⁸, 5704⁶). Iver Igelsrud

A58-5LA METALLURGICAL LITERATURE CLASSIFICATION



3

***X-Ray Examination of the Thermal Treatment of Magnetic Aluminium Nickel Iron Alloys.** L. Vereshagin and G. Kurdjumov (*Zhurnal Tekhnicheskoy Fiziki* (*J. Tech. Physics*), 1933, **3**, (9), 1629–1631).—[In Russian.] The structures of two iron alloys containing aluminium 11·22 and 10·23, nickel 24·36 and 26·66, silicon 0·18 and 0·02, and carbon 0·2 and 0·055%, respectively, were examined after annealing for 1 hr. at 1200° C. and quenching and after a subsequent precipitation heat-treatment at 300°–1000° C. The alloys have a body-centred cubic lattice with regular atomic distribution. The changes in coercive force produced by heat-treatment are not related to the separation of the disperse phase since the lattice parameter is unchanged by the precipitation treatment, but are caused by internal changes in the solid solution itself during precipitation.—N. A.



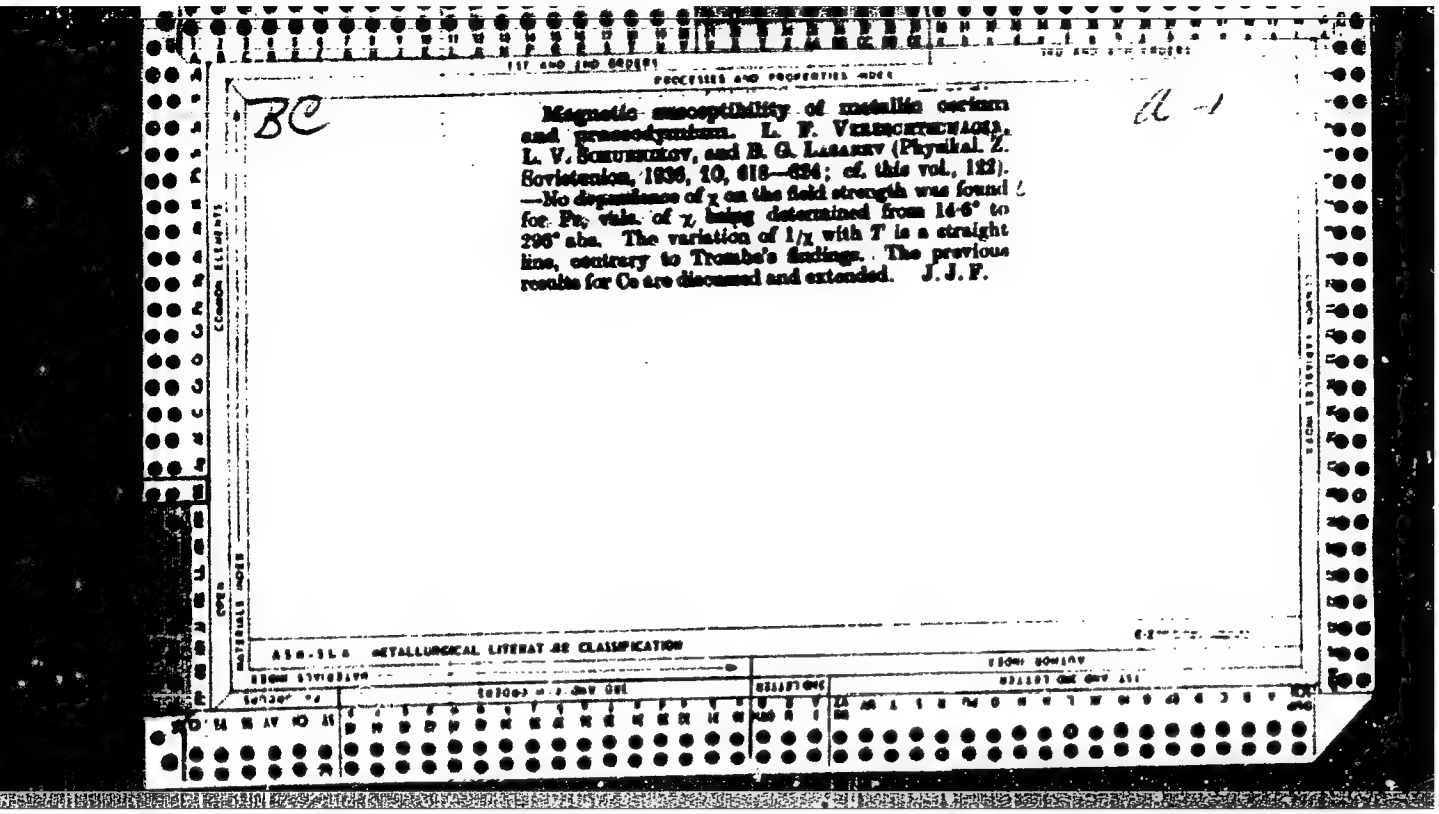
A-3

BC

Magnetic susceptibility of metallic cerium. L. F. Vereshchagin, L. V. Sokurenkov, and B. G. Lazarev (Physikal. Z. Sowjetunion, Spec. no., June, 1936, 107—110).—The magnetic susceptibility (χ) of Ce has been measured at 2815, 4545, and 6195 gauss, and between 20·4° and 290° abs. χ does not follow the Curie-Weiss law, especially at lower temp. Divergencies from the results of Doshina and Jaanus (see preceding abstract) are explained by the latter applying to weak fields and probably to material containing ferromagnetic impurities.

J. W. S.

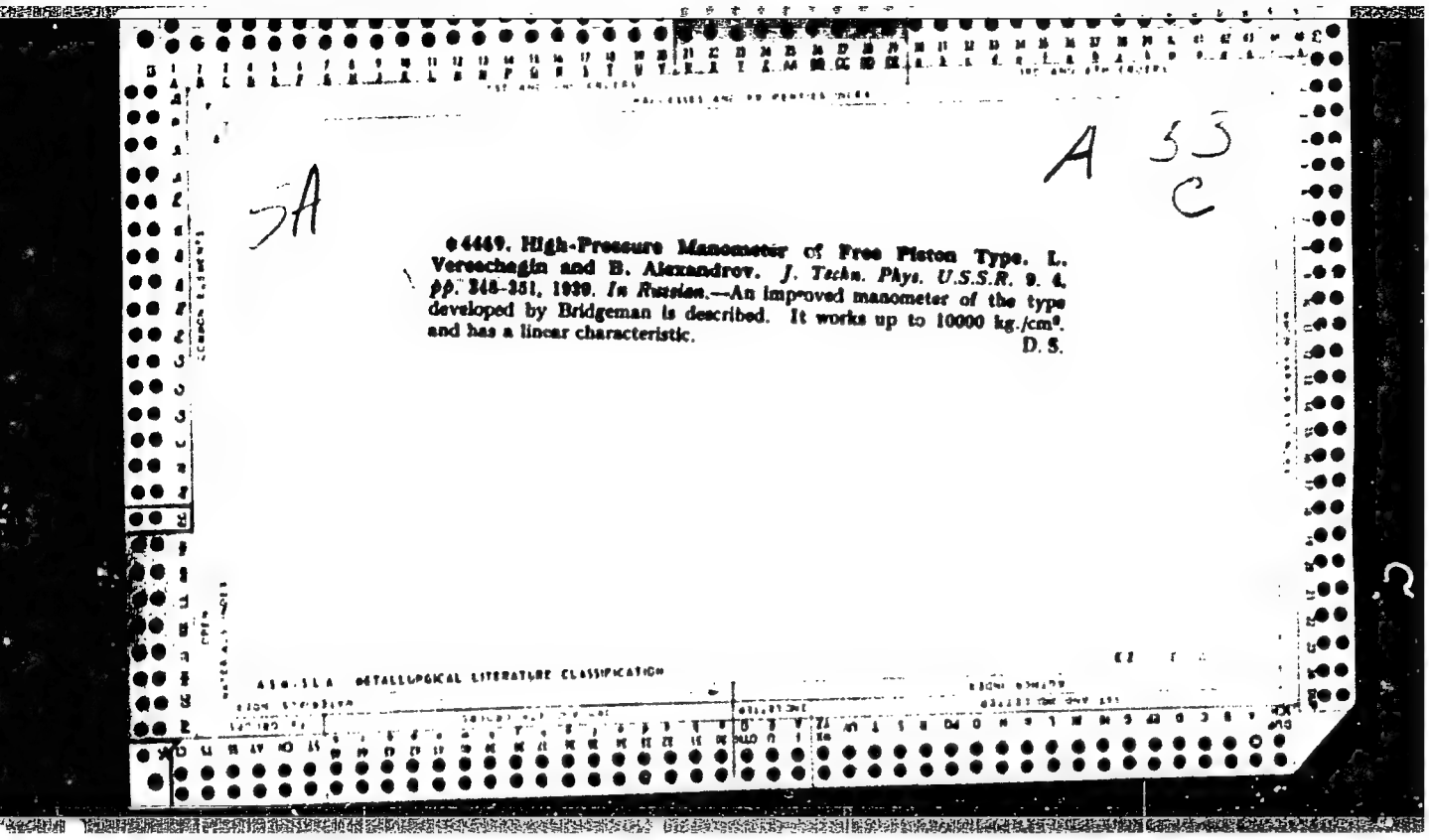
A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION



BC

d-1

Magnetic susceptibility of metallic cerium and praseodymium. L. F. Vereshchagin, L. V. Sokurantov, and B. G. Lazarev (Physikal. Z. Sovietunion, 1936, 10, 618—624; cf. this vol., 122). —No dependence of χ on the field strength was found for Pr, viz. of χ being determined from 14·6° to 296° abs. The variation of $1/\chi$ with T is a straight line, contrary to Trombe's findings. The previous results for Ce are discussed and extended. J. J. F.



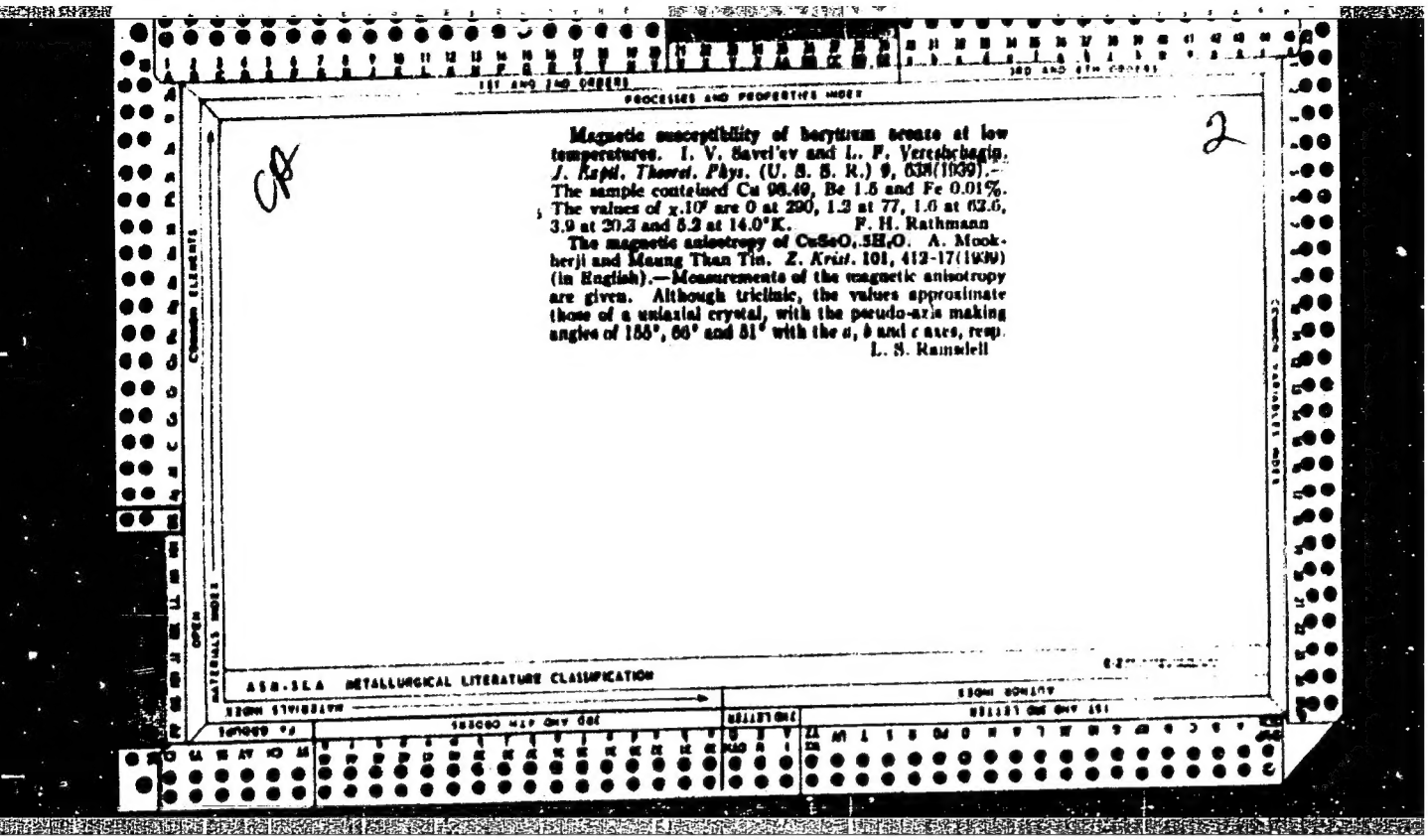
A 55
C

5A

C

#4469. **High-Pressure Manometer of Free Piston Type.** L. Vereschagin and B. Alexandrov. *J. Techn. Phys. U.S.S.R.* 9. 4. pp. 348-351, 1939. *In Russian.*—An improved manometer of the type developed by Bridgeman is described. It works up to 10000 kg./cm². and has a linear characteristic.
D. S.

A 54.1 A METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

2

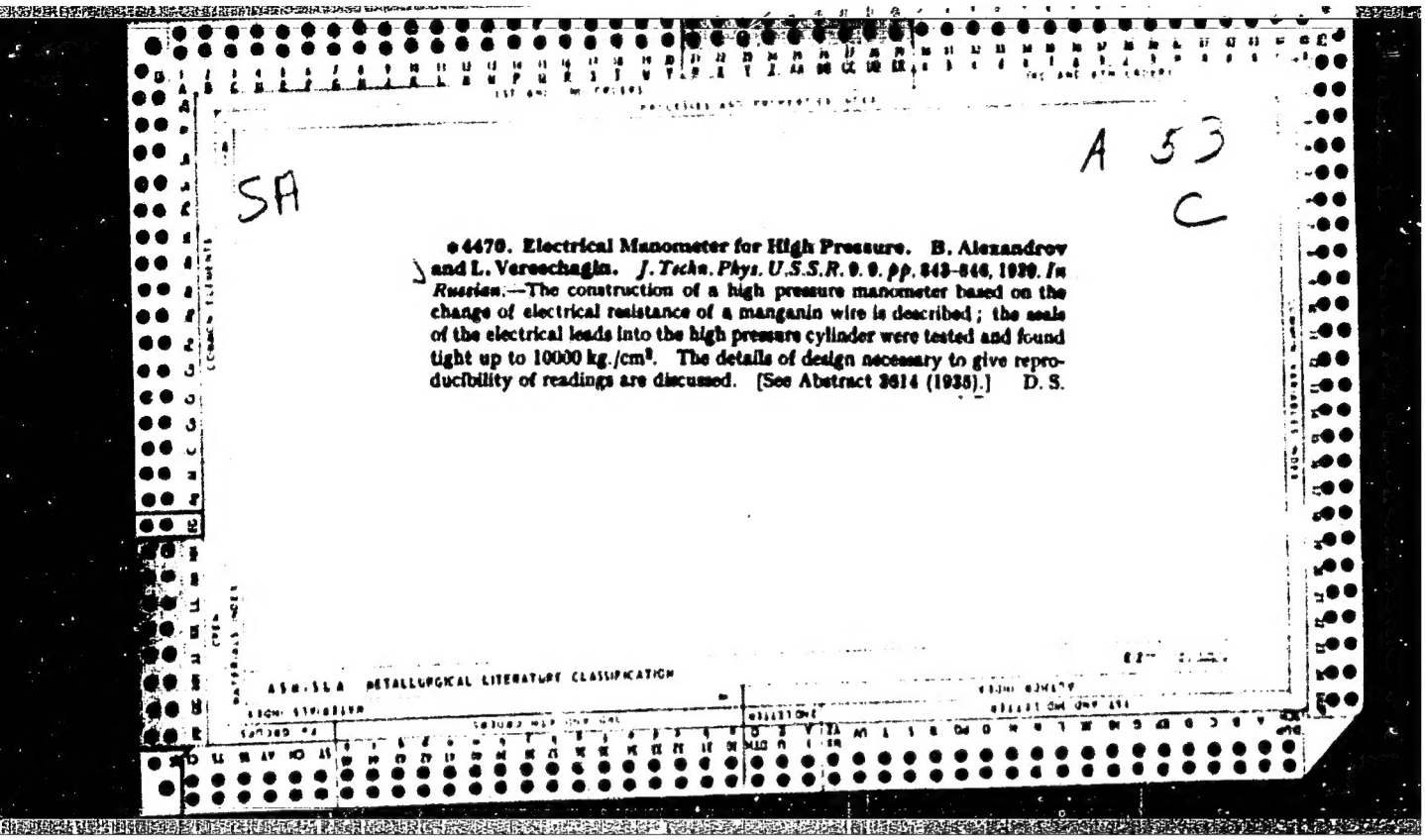
Magnetic susceptibility of beryllium oxide at low temperatures. I. V. Savel'ev and L. F. Verschchagin. *J. Exptl. Theoret. Phys.* (U. S. S. R.) 9, 638(1939).—The sample contained Cu 98.40, Be 1.5 and Fe 0.01%. The values of $\chi.10^6$ are 0 at 290, 1.2 at 77, 1.0 at 62.6, 3.9 at 20.3 and 5.2 at 14.0°K. F. H. Rathmann

The magnetic anisotropy of $CuSeO_3.5H_2O$. A. Mookherji and Maung Than Tin. *Z. Krist.* 101, 412-17(1939) (in English).—Measurements of the magnetic anisotropy are given. Although triclinic, the values approximate those of a uniaxial crystal, with the pseudo-axis making angles of 155°, 66° and 81° with the *a*, *b* and *c* axes, resp. L. S. Ramsdell

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

VERESHCHAGIN, L. F.

"Polymerization at Superhigh Pressures," Acta Phys., 19 No. 6, 1944.



SA

A 53
C

● 4470. **Electrical Manometer for High Pressure.** B. Alexandrov and L. Vereschagin. *J. Techn. Phys. U.S.S.R.* 9. 9. *pp.* 843–846, 1939. *In Russian.*—The construction of a high pressure manometer based on the change of electrical resistance of a manganin wire is described; the seals of the electrical leads into the high pressure cylinder were tested and found tight up to 10000 kg./cm². The details of design necessary to give reproducibility of readings are discussed. [See Abstract 3614 (1935).] D. S.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

VERESHCHAGIN, L. F.

"Studies On Chemical Reactions Under Ultra-High Pressure And At High Temperature: I. A New Set-Up For The Investigations of Chemical Reactions At A Pressure Up to 5000 ATM. And High Temperature," Iz. Ak. Nauk SSSR, Otdel. Tekh. Nauk, No. 6, 1943.

Inst. of Organic Chemistry, AS